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ORIGINAL COMMUNICATIONS.

Notes on Fractures of the Upper Extremity. By JOHN H. PACKARD, M.D., one of the Surgeons of the Episcopal Hospital, Philadelphia.[1]

Before entering upon the special subject above indicated, I beg to offer a few considerations in regard to the mechanical structure of the skeleton, and upon the causes of fracture generally. Certain propositions as to the phenomena attending these injuries may also be properly laid down, to be discussed subsequently in connection with particular fractures.

Every student of anatomy is familiar with certain general facts in regard to the arrangement of the bony skeleton, and the material of which it is composed. He learns, as a matter of course, the distinguishing features of each bone, its form, processes, and relations to neighboring parts. And when he comes to apply this knowledge surgically, he finds that at some points fractures occur much more readily and often than at others.

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[1] The present paper, and the succeeding ones under this title, will embody the substance of a series of lectures (the second under a bequest of the late Dr. Mütter) delivered in April last, at the Hall of the College of Physicians of Philadelphia.

The main function of bone is resistance to mechanical forces. Whether it forms the case for delicate structures, such as the cerebro-spinal axis, or the system of levers on which the muscles of locomotion act, this power of resistance is its great requisite. Its material, therefore, combines the power of sustaining vast pressure with great toughness.

Holden[1] gives the following statement, on the authority of Ward:[2] "A cubic inch of cancellous tissue was taken from the lower end of the femur, and placed with its principal layers upright. Four cwt. was then placed upon it, but it did not give way in the least. Six cwt. made it sink half an inch, yet the cubic inch of bone itself did not weigh more than fifty-four grains."

Friction wears bone away very quickly, and it is nowhere subjected to such force in the skeleton. This is an accepted fact in the arts also, rendering bone very valuable from the ease with which it is worked, but unfitting it for certain purposes.

The observation has been made[3] that the direction of the columns of cancellous structure always indicate the line of greatest strength in the bone, and of greatest stress upon it. On careful examination of sections of the various parts of the skeleton, it will be found that this principle is everywhere distinctly traceable. In other words, the material is so arranged that wherever stress comes upon any bone the pressure is borne by a column consisting of the largest available number of osseous particles. For example, in this section of the head of the femur, we find running up to the concave surface of its compact shell a great many lines of cancelli, which meet below in the upper extremity of the compact tissue forming the inner wall of the shaft, so as to receive all the pressure of the acetabulum and transmit it to the column intended to bear it. (See Fig. 1.) If the neck of the bone be divided in the other direction, *i. e.*, from before backwards, on a plane corresponding with its axis, the columns of cancellous tissue are seen to have

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1 Holden, "Human Osteology," p. 8.

2 Ward, "Outlines of Osteology," p. 368.

3 First published, I believe, by Prof. Wyman, of Cambridge, Mass., in the Transactions of the American Medical Association for 1850.

no such special arrangement, since the pressure they bear is diffused evenly throughout the whole mass. Again, wherever there is a concave joint surface, the cancellous tissue is arranged

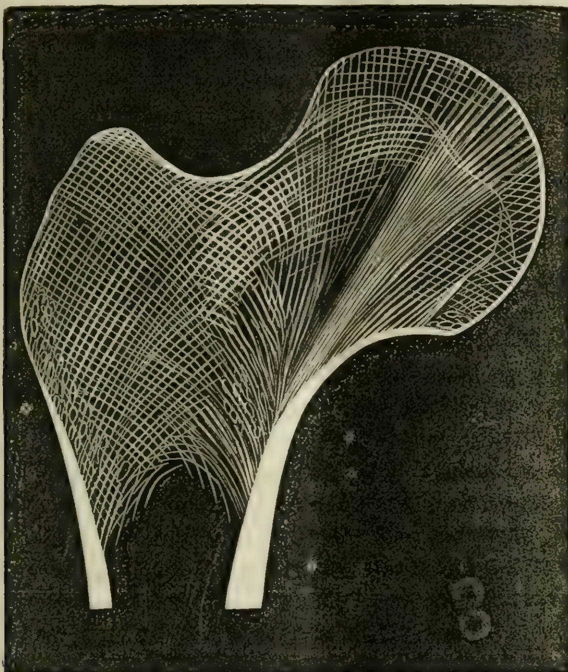

Fig. 1. Diagram of Upper End of Femur.[1]

so as most effectually to stay up the thin layer upon which the pressure must come. Generally the columns run very accurately at right angles to the outer layer. It needs no argument to show that by means of this arrangement, not only are the expanded articular surfaces of the bones so supported as to be adequate to all the ordinary pressures to which they are liable, but the shock inseparable from the acts of walking, running, etc., is lessened by distribution.

So entirely has this principle been overlooked, that in the most elaborate anatomical engravings the cancelli have been

[1] This and the other diagrams accompanying these papers are essentially the same as the illustrations drawn on the blackboard at the time of delivery of the lectures.

invariably represented as altogether irregular in their arrangement. The only mention of it in a systematic work, so far as I know, is in an "Elementary Treatise on Human Anatomy," by Dr. Leidy, of Philadelphia.

Another application of this principle is found in the relation of the muscles of the extremities to the long bones on which they act. The lines of traction of the former are usually at a very acute angle with the axes of the latter. By this arrangement the pull of any muscle bears mainly upon a long column of bone, which is of course less likely to give way than if the two were at right angles. Exceptions to the rule exist, and there are other ends answered, such as convenience and elegance of shape; but this mechanical advantage cannot be overlooked as one of the objects of the original plan.

On looking at the skeleton as a whole, one can readily recognize in it a system of arches superimposed upon one another. In the foot, one arch is formed transversely at the root of the toes, and another antero-posteriorly from the toes to the heel. The former arch is continued backwards by means of the metatarsal and tarsal bones to the ankle-joint, where the expanded lower extremity of the tibia represents an arch opening downwards, while its upper extremity, in like manner, opens upwards to meet the arch of the femoral condyles. Above this we find the thigh bones curving inwards to form an arch, the keystone of which is the pelvis; and above this, again, a succession of arches opening upwards and downwards in apposition to one another, until we come to the base of the skull and the culmination of the system in the dome which covers in and protects the brain.

Such being the arrangement of the bony substance, strictly speaking, by which, as is clear, the objects of strength, lightness and avoidance of shock are greatly favored, we may easily perceive that the addition of articular cartilages and synovial fluid, and the balancing effect of muscular connections, together with the flexibility of the various joints, will reduce to a minimum the chances of fracture.

None of the bones are absolutely straight; some of them, as the clavicle and femur, are decidedly curved, more or less in different persons. Here the principle of the arch is obviously

concerned. Any force applied at one end of the curve and resisted at the other would tend to drive the abutments of the arch closer together, and thus to cause a fracture at the weakest point. Hence we always find the concave portion of the bone, the intrados of the arch, the shortest line between the two ends, strengthened—the shaft-wall being thicker at the concavity than at the convexity of the bone. A striking instance of this is found in the linea aspera at the back of the femur, and in the lower wall of the cervix of the same bone.

If, now, we look at a transverse section of any long bone, such as the humerus, we find that, although modified by special conditions, the general idea is carried out of two arches apposed by their abutments; so that the greatest possible resistance is offered to any crushing force applied in this direction. (Fig. 2.) And upon examining any transverse section of bone microscopically, we discover a system of like arches, on an extremely minute scale, it is true, but arranged on the same principle and to a like end. (Fig. 3.) A general view of a long bone, therefore, shows it to be in fact made up of a bundle of parallel tubes, this being the disposition of material by which the greatest amount of resistance is offered to force in any direction.

Fig. 2.

Fig. 3.

The principle of the lever is constantly observable in the mechanism of the skeleton; and I believe, as will be pointed out in connection with special cases, that it has much to do with the production of some hitherto unexplained fractures.

The forces to which the bones are subjected, and by which their fractures are caused, are very various—much more so in man than in the inferior animals. Man is more liable to fractures, indeed, not only on account of his erect posture and the anatomical peculiarities incident thereto, but also by reason of the artificial conditions in which his intellect leads him to

place his body. It needs but a glance at the recognized and recorded causes of fractures to establish this point.

It is often a very difficult matter to trace, with any degree of accuracy, the mode of production of a given fracture; but we may be sure that there must always be two forces, or a force and a resistance, each of which is greater than the power of resistance of the bony structure.

The only forces intrinsic to the body, acting on the bones, are the muscles. These, in conjunction with forces from without, are very constantly concerned in the production of fractures.

We shall hereafter have to inquire into certain cases in which muscular action alone is thought to give rise to fracture.

I think it can be shown that these cases have not generally been explained aright, and that even where the muscles are the chief agents in the breakage, there are other elements which cannot be left out of the account.

Sometimes the two forces which cause fracture are obvious, as, for example, when a man falls from a height, lighting on his feet, and his thigh bones give way between the momentum of his body and the resistance of the ground. Almost invariably, however, in such a case, the muscles of the entire limb, and even those of the trunk, are in action, keeping the bone rigidly fixed in a certain relation to the rest of the body. We may imagine still another force acting on the bone, if, for example, a stone were thrown or a ball fired so as to strike it at the exact moment of its yielding to the forces already mentioned. But this could so rarely happen that it need not be considered.

The muscles acting upon a bone subjected to two opposing forces, tending to break it, would sometimes favor the fracture, while sometimes they would tend to save the bone, by maintaining its line.

In estimating the influence of different muscles for or against any fracture, it must be remembered that they are generally attached to the bones at different levels, and the direction of their power varies as well as its amount; so that it is very seldom that two muscles, or two sets of muscles, exactly balance one another. And yet the precise conditions of mus-

cular action must always be considered in studying the production of special fractures.

In the case of fracture by direct violence, the ordinary laws of mechanics hold good. Thus a bone is held in a certain position by its anatomical connections, while a force is applied to it sufficient to overcome its rigidity. Its inability to move before that force constitutes a resistance. A bone hanging perfectly free could not be broken.

But bones are sometimes broken by forces apparently inadequate—such as a quick, smart blow with a stick or stone, or a sudden change of posture. Here we may be sure that the direction and degree of the violence has been such as to take the bone at a disadvantage. Or the velocity of the small impinging body has been very great in proportion to its weight, so that its momentum, made up of these two elements, is expended on a very limited portion of the bone, and that too so instantly that there is not time for it to be communicated to the remainder.

Just in the same way a stone thrown so as to strike a pane of glass, while moving with great velocity, may pass right through, leaving but a very small opening. Had it been moving slowly, the whole pane might have been shattered to pieces. And as a general rule, in the case of the long bones, if force is applied suddenly and sharply the resulting fracture will be more nearly transverse than if it be applied slowly and gradually.

Whatever the character of the force, the bone will always give way, if at all, in the direction of least resistance; and this will depend, of course, upon various elements, which are not all within our scope of recognition.

According to these views, the usual rationale of fracture of a long bone is, that the bone is either placed between two forces tending to bring closer together the abutments of the arch which it forms, or that, as an overtaxed lever, it gives way at its weakest point. This point may be at the fulcrum, or anywhere intermediate between this and the other points acted on. Examples of both these mechanisms will be readily found.

On the same general principle, it may be remarked here, in

all cases of so-called fracture by muscular violence, the bone involved is in some way fixed against a solid *point d'appui*—the muscles then acting upon it either as a lever or as an arch whose curvature is to be increased. Without some great mechanical advantage so derived, the muscle might rupture, but the bone could not yield unless diseased. We are told, by some authors, of fractures by *avulsion*—the tearing off of the olecranon, the coracoid process, the patella, or the malleolus, the bony substance proving less tenacious than muscle or ligament. I think it can be shown in all these cases that, in fact, the bony fibres are acted upon as levers, and give way as such.

One other mode in which bones may be broken is by torsion. This is plainly the mechanism of some cases, especially in the humerus, and it is perhaps associated with other forces in the production of more fractures than we generally suppose.

Among the *predisposing* causes of fracture spoken of by authors, we do not find one of which I think mention should be made—namely, the individual peculiarities of the skeleton. It does not need more than a superficial study of several sets of bones to convince any one that, while the osseous system presents a very accurate correspondence in its general markings, there are decided differences in the bulk, weight, compactness and strength of the bony framework between one man and another. A striking example of this may often be seen in the thigh bone, which varies greatly in the degree of its curvature, in the relative expansion of its condyles to the thickness of the shaft, and in the length and inclination of its neck. As dependent upon the time of life of the subject, these variations have indeed been noted and are well known; but they should, in my opinion, be studied also as peculiarities of individuals, predisposing to certain forms of fracture. I shall have occasion to point out in detail the applications of this statement in connection with special cases.

Besides these variations in the outward form and bulk of bones, there exists often a marked difference in the degree of fineness and closeness of the cancellous structure, as shown by sections of the bones of different individuals. And a singular fact which I have noticed is, that there is no direct proportion between the apparent delicacy of shape of a bone and the fine-

ness of its cancelli. A marked instance of this is shown in two tibiæ, of which sections were made for the museum of the College of Physicians of Philadelphia. One of these tibiæ was a large, coarse, strongly marked bone; but on cutting it, its cancelli were seen to be very delicate and the interstices very fine. The other, a much lighter and slenderer bone, had a cancellous tissue of remarkably coarse structure, with very large interspaces.

The only one of the symptoms of fracture upon which any general remarks need here be made, is the deformity or displacement of the fragments. This may obviously depend either upon the original violence or upon some mechanical condition subsequently developed, such as the weight of the distal portion of the limb, or muscular action. No argument is needed to prove the readiness with which the first of these causes may act. A striking example of the influence of the weight of the parts attached to the distal fragment may often be seen in fracture of the thigh, when the foot falls outward or inward, and rotates the lower fragment of the femur with it. With regard to the power of the muscles to give rise to deformity, the authorities of the present day have suggested doubts. Malgaigne, who has entered more fully into the general principles concerned in the production of fractures and their symptoms than any other writer, and whose opinions have, as they deserve, great weight, speaks as follows:

"It is generally stated that the majority of displacements are produced by the muscles; so that, a fracture occupying a given point in any bone, according to this theory we may foretell the displacement which will ensue. So far has this idea been carried that an English writer, Hind, wishing to show by a series of plates the causes of displacement in fractures of the extremities, could find no better plan than to delineate the bones and muscles of a dead body, making the latter pull on the former according to the seat of fracture—never dreaming that the Hunterian Museum, some paces from his amphitheatre, would have utterly contradicted in advance his fantastic representations.

"No: in the great majority of cases the course of things is not as is stated by anatomists; the muscles alone have not so much

power as is claimed for them, and they meet with many obstacles which they cannot overcome. The impulse given by the cause of fracture, the direction of the fracture, the impaction of the serrations, the resistance of the periosteum and other soft parts, the position and the weight of the limb, mainly determine the nature and extent of the displacements; only one of these latter can be under the almost isolated influence of muscular action—I allude to overlapping. But it must be remembered that then it is not one or two muscles which act on the fragments, but the whole muscular mass surrounding the bone; and that the overlapping, by burying still more the broken ends in the flesh, causes almost always an irritation, raising the contraction to a pathological degree. On the contrary, when a fragment is pulled upon by only one or two muscles, we may say that it yields to their action only as far as it is entirely free and unopposed either by the direction of the fracture, by the resistance of the periosteum or of other muscles, or by the weight of the limb." [1]

Hamilton, who may be considered the leading American systematic writer on fractures, says that the "deformity, produced by either an angular, transverse or rotary displacement of the fragments, is much more often due to the direction and force of the impulse which occasioned the fracture than to the action of the muscles." [2]

With due respect for the high authority of M. Malgaigne, whose work on fractures and dislocations must rank among the classics of medical science, and for the practical experience of which Dr. Hamilton's book gives such abundant evidence, I shall endeavor to sustain a view opposed to those now quoted. We can scarcely overlook the part taken by the muscles in aiding or counteracting the original violence producing the fracture; in some cases, indeed, it may be clearly proved to be extremely important. And even by the authors mentioned the necessity of attending to this cause of deformity during the treatment is strongly urged. But if the muscles act either with or against the fracturing force, it seems to me to be in

[1] Malgaigne, Traité des Fractures et des Luxations, tome i., p. 100. Transl., vol. i., p. 93.

[2] Hamilton, Treatise on Fractures and Dislocations, p. 35. (2d edit.)

accordance with mechanical laws that they should also by their contraction promote or correct the resulting deformity. And if they constitute an important obstacle to the restoration of the broken bone to its normal shape, when do they begin so to act, if not at the very moment of the breakage?

A discussion of this question in the abstract is, however, unnecessary, as it must be maintained, if at all, by establishing its correctness in regard to special fractures. Its distinct statement, as a matter in regard to which a certain position is to be defended in the ensuing pages, has seemed to me but proper.

A few words may here be said as to the scope of the subject before us. In order to its intelligent study the anatomy of each bone must, of course, be thoroughly known. But besides this, its relation to all the other bones with which it is connected by ligament or muscle, the direction and closeness of those attachments, and the mechanism of the systems so formed, must be examined. Almost every bone in the body is merely a member of a mechanical system, and in its normal function, as well as in its broken state, is acted upon as such, so that muscles which have no direct or apparent influence upon it do in reality affect it very materially. That these are not mere truisms, I shall endeavor to show in the succeeding papers of this series.

The Treatment of Fracture of the Lower Jaw by Interdental Splints. By THOMAS BRIAN GUNNING, New York.

(Continued from September No., p. 448.)

CASE 1.—A seaman, senseless from explosion of powder on board a Spanish frigate, was sent to the U. S. Naval Hospital. A comminuted fracture of the lower jaw was found between the canines, a piece of the bone loose in the mouth, the teeth of both jaws much shattered, with face severely burnt and lacerated. The case had been carefully treated for over four months without producing any union, when, by the advice of Surgeon Bache, Director of the Naval Laboratory, I was requested to treat it. The jaw was contracting from loss of bone, and pieces were coming out through the chin. I applied a hard, vulcanized rubber splint, which inclosed the remaining

teeth and gum of the lower jaw, its upper surface fitting well over the teeth above, except in front, where it was trimmed down to allow food to pass between the remnants of the superior incisors. The splint was fastened to the lower jaw by screws passing into a broken tooth on each side. The jaw was held up by starched muslin, moulded to a cast of the parts, in repeated folds, until a line in thickness.[1] This reached to the the zygomas, and was kept up by a band passing over the head. The splint was applied Feb. 12, 1861. Fragments of the bone came away for some time after, but the splint was not removed during the treatment. The jaw united well by the middle of May, and the man was sent home to Cuba.

Splints of similar construction, but without screws, and with a different bandage, were subsequently used with great success in over forty cases in one of the hospitals of the Confederate army in 1864.[2]

Case 2.—I received a compound fracture in my own jaw between the right canine and lateral incisor teeth on November 4th, 1862, through my horse falling under me. The bone was much displaced and two incisor teeth loosened. I set the bone, and it was held by strong, well stretched silk, inclosing three incisors, the right canine and first bicuspid. This stopped the bleeding forthwith and held the bone firmly. A vulcanite splint was applied thirteen hours after injury. It inclosed all the lower teeth, and was fastened by gold screws to the first molars. It held the fragments so well that I was able to attend to patients in the afternoon, and continued to do so subsequently. The gum united by first intention, and the pain and swelling, which were very great in the external parts, diminished rapidly.

November 28th the splint was removed, and good but flexible union found. It was again fastened on, but after seven days was worn without the screws, and removed daily. The jaw grew strong, the teeth firm, and the splint was left off January

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[1] A bandage of thick gutta-percha was tried first, but it yielded to the shape of the jaw so much that it increased the tendency to contraction. The pliancy of gutta-percha is a radical objection to its use in or out of the mouth, except when it can be supported.

[2] See Richmond Medical Journal, Feb., 1866.

1st, 1863, but worn at night until February 1st. Jaw was used in eating, talking, etc., throughout the treatment. The incisor teeth have regained their communication with the inferior dental nerve. This was severed by the displacement of the fragments, which was so great as to admit the little finger between the teeth. Judging from the sensation of slight tightness between the front teeth in certain movements of the muscles, the bone was twelve months in growing as stiff as before the accident. The case was presented to the New York Academy of Medicine, January 7, 1863, by Dr. A. L. Sands. Prof. Alexander Stevens said the splint was a great improvement, and that the treatment would last forever.[1] The splint was brought before the Medical Society of the State of New York in February.[2]

CASE 3.—G. B., forty-five years old. Jaw fractured through socket of right second bicuspid, June 5, 1863, by a blow. Displacement of back fragment inward and forward. Patient could not lie down, but slept in a chair, *holding* the jaw, as the surgeons could not keep the fragments in place. The fracture commenced inside the first bicuspid tooth, and passed backward and outward through the socket of the second, and downward, also, at the expense of the back fragment. As the loosened bicuspid had been extracted instead of being kept in place, there was nothing to prevent the back fragment from sliding inwards and over the front one. It was set and held in place by a jackscrew, of which one end rested on the left side, between the first and second molar teeth. The other end went into the short fragment, about the centre of the fracture, and as low down as the muscles under the tongue allowed. This held the parts firm while the impression and bite were taken, the mouth cup being notched out to go down over the ends of the jackscrew. On June 17th I applied a splint like Fig. 1, without screws, but held down by a strip of silk passing under the chin, and, supported by wings which projected from the splint, came out over the lower lip, and continued along the sides of the jaw like the wings of Fig. 4. Splint held the bone in place, although there were but two loose teeth in the back

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[1] See Bulletin of the Academy,

[2] See the Society's Transactions for 1863; New York Medical Times, August 8, 1863; Dental Cosmos, September, 1863.

fragment—first molar having been out for years, and the second bicuspid lost through the fracture. Patient could now lie down comfortably. The band was worn snug until June 24th, when it was slackened because of painful swelling under the chin. No displacement following, the band was worn loose afterward. July 20th, splint removed to examine the jaw and flexible union found; 29th, callus firmer. August 8th, improving; 18th, wings cut off, but splint worn until September 3d. Jaw allowed its natural motions throughout treatment.

This splint was presented to the New York Academy of Medicine, in October, 1863.[1] I received the thanks of the Academy, accompanied by a request to report further when I should have completed the splint which I considered best adapted for general use. In answer to this request, the splint represented by Fig. 4 was fully described in the paper mentioned at the head of this article.

Case 4.—J. Q., twenty-five years of age, had his jaw broken by being thrown from a cart, December 29th, 1863. On the same day he called in a physician, who tied the teeth together and sewed up a deep gash over the left masseter muscle. The ligature did not permanently control the fracture; the teeth became very loose and the front of the jaw was drawn back inside of the left fragment. Patient went into the Bellevue Hospital January 9th, 1864. The left lateral incisor, loosened by the accident, having been extracted, attempts were made to hold the jaw in place by passing wire around the teeth, but without success. January 14th patient was brought to my office. I find the jaw fractured through the socket of the left lateral incisor, slanting toward the symphysis as it descends, thence back at the expense of the inside of the left fragment. The gum is red and painful; great tenderness under the jaw and upon the ramus, which was also *supposed to be fractured.* I find it is not. The gash across the left masseter muscle is about two inches long, and through it the bone can be distinctly felt with the finger; much swelling, which is extending; pus discharging freely into the mouth and externally from the wound near the angle. Tied the fragments, taking in the remaining incisors, both canines and left bicuspids in the liga-

[1] See Bulletin of the Academy.

ture, as the central incisors were quite loose, the one next the injury and also the left canine so much so that the fingers would have taken them out easily. A piece of wood was placed endwise across the socket of the extracted lateral incisor, bearing against the central incisor and the canine, to prevent displacement while taking the impression. This held the fragments in place, but it was impossible to get the jaw into its natural position relatively to the upper. The left masseter muscle, weakened by the cut, having been inactive for so long a period, the parts had settled over to the left, and I was obliged to take the bite in that position.

January 15th. Applied a vulcanite splint, like Fig. 1, without screws or any other fastening. It held the fragments in place, and the patient experienced great relief. February 13th, took off the splint temporarily, no displacement followed, but union was very soft. After this, removed the splint and examined the parts weekly. March 19th, the wound is healed. Removed the necrosed socket of the extracted incisor. Union firmer, teeth improved. April 9th, union strong, but it is advisable to wear the splint longer, on account of the canine tooth, which is growing firm. The jaw now articulates with the upper, and the upper and lower teeth fit against each other well. May 1st, splint dispensed with.

I have used this kind of splint on many patients, and always successfully. Amongst them were cases which had been treated, without avail, in civil and military hospitals of this and other places. I have never seen it fail to hold the bone in place, although used without any fastening in the mouth, or support externally from bandage. In one case the jaw was broken by a Minie ball into seven or eight pieces, and part of them, with one tooth, lost.[1] In another much of the mental process was shot away, together with three front teeth.

[1] I extracted this tooth, the left central incisor, it being forced out in front, as the lateral had closed up so as to touch the right central incisor through the contraction of the parts, the fracture being two months and ten days old when I took charge of the case. One fracture went down through the socket of the ejected tooth, and another between the second left bicuspid and first molar. The alveolar inside the four teeth between these fractures was all necrosed, and that outside completely loosened from the bone below, the separation being horizontal and on a line with the end of the roots. This

CASE 5.—Mary Ann D., twenty-nine years old, was found in a state of insensibility, Feb. 12, 1864, and sent to the Bellevue Hospital the next morning. She remained unconscious until the 16th.

February 17th. Dr. R. B. Brownell spoke to me of her broken jaw, but said nothing could be done to it at present, as her head and face were so terribly swollen.

February 21st. Saw the patient at the hospital, and found her lower jaw broken on the right side, commencing half an inch back of the canine tooth, and passing downward at the expense of the back fragment. There have been no teeth back of the canine for some time, and, the gum being torn, the back fragment rides over the front, with its point sticking out sharp and bare, for three-eighths ($\frac{3}{8}$) of an inch, in the direction of the symphysis. Although there is much swelling around the fracture, in and out of the mouth, also over the left zygoma and down the ramus, there is *great mobility* of the front of the jaw.

February 22d. Patient was brought to my office. Swelling on the face lessened somewhat, but still undiminished in the gum around the fracture. On the left side there are no teeth back of the bicuspid, and the gum is sound and healthy, but indented by the upper wisdom tooth which has been pressing into it since the accident, previous to which it had not done so, except when the gum was swollen eighteen months before. This condition of the parts induced me to examine the left ramus carefully, and I found great play of its upper back portion, especially inward, but the only displacement when at rest, is upward and forward, and this to no great extent, as it is checked by the upper wisdom tooth. Finally concluded that a fracture exists in the neck of the condyle, passing downward

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alveolar, with the four teeth attached to it, would have turned down externally at a right angle had the gum been cut vertically at the ends. I took away the necrosed portion, made the outer part fit at the symphysis, and set all in place. The splint was applied July 22d, 1864. When it was taken off, December 11th, the jaw was united in every part, and the teeth were all fast, with the gum firm around them, but on the inside not quite as high as on the corresponding teeth of the other side of the mouth. To avoid being sent to the army again, the man wore the splint three months longer, without my knowledge, but the teeth and gum were not injured any by it.

and backward, thus allowing the muscles to draw the bone upward and forward.

The lower jaw contains only the four front teeth, the two canine and first left bicuspid. The gum back of these is free from roots, except that of the right wisdom tooth, which still remains, but decayed close down. The upper jaw has been without the eight teeth forward of the second bicuspids for some time; of the other eight, seven still remain, the right second molar only having been extracted.

To set the jaw, the right fragment was put in the best position that could be obtained with the fingers, assisted by a stout piece of silk passing round the left canine. A jackscrew, with a collar fitting against the root of the wisdom tooth in right fragment, and the other end bearing on the gum between the left lateral incisor and canine teeth, was then screwed out until the extension was sufficient to allow the fractured bone to come into proper position. The end of the long or forward fragment was then held up, and an impression in soft wax taken of all the teeth and gum, as far back as the ramus on each side. Care was taken to put the bone in place at the neck of the condyle while the bite was obtained.

February 28th. Applied the splint.[1] The surgeon who brought the patient to my office wished to try and hold the chin up with a leather bandage of Hamilton's pattern. It held the chin up very well for a short time, when tightly buckled, but in an hour the jaw fell away somewhat.

February 29th. Swellings on the head, temples, etc., with pain caused by the bandage.

Compresses were placed over the head and temples, and great pains taken to prevent the bandage from hurting. It was worn so loose that the teeth went up and down in the splint to such an extent that it was feared the jaw would get out entirely.

March 2d. Patient brought a request from the surgeon in charge of her case at the hospital that I would screw the splint fast to the teeth, that the bandage may be dispensed with, for the swellings on the head, temples, etc., are much increased.

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[1] See Fig. 2, taken from the original.

The lower lip is also very painful on the right side, in front of the canine. Gum has grown over the point of the bone; it is therefore only a simple fracture now. Screwed the splint fast.

March 10th. Swellings caused by the bandage nearly gone. Patient complains of pain in swallowing. Removed splint, and shortened the left end, which had cut into the palato-glossus muscle. Bone is united so well as to keep its form, and the fracture at the neck of the condyle is doing well. No complaint as to the teeth.

March 14th. Patient in good spirits and quite comfortable. Wants to leave the hospital and go to work. No complaint as to the teeth.

March 26th. At my request patient was discharged from the hospital, but still wearing her splint.

April 8th. Splint removed and good union found. Splint was worn just forty days, but the patient has a fine constitution and the bone united rapidly.

June 7th, 1865. Patient sent me word that the jaw was all right.

In this case the fractured jaw was held by the splint in proper relative position to the upper jaw, but in the next case the jaw was held *out* of its proper position.

Case 6.—Patient thirty-six years old, the son of a physician in Brooklyn; jaw fractured through the symphysis, and the right condyle dislocated outward and backward, February 10th, 1866, in falling down stairs, and striking the chin on a small desk. The dislocation was reduced, but the displacement of the jaw being found uncontrollable, I was called in consultation.

February 14th.—Patient has been confined to his bed since the accident, motion being insufferably painful. The right side of the jaw is so much out of place that the lower back teeth strike nearly outside the upper. At the point of fracture, the left fragment is inside the right with a lateral displacement of five or six lines, and nearly that much vertical displacement. Much swelling and pain under and inside the front of the jaw, with terrible suffering in the right glenoid fossa and ligaments when the condyle is moved. There is a firm, smooth swelling upon the outer part of the neck of

the condyle, but nothing that indicates fracture of the bone, although the back teeth touch too soon, and it is impossible to get the lower bicuspids up to those above them. This is probably caused by some displacement or injury of the interarticular cartilage, which allows the condyle to go up too far into the glenoid fossa. The left side of the jaw will move in any direction, being uninjured, and the muscles in good condition (except at the symphysis). This accounts for the fragments being carried over to the right side, where the ligaments and muscles are so *crippled* as to be *unable* to *balance*, or antagonize those in good condition on the left. Packthread was passed around the left bicuspid, with a piece of wood through the other end, to assist the fingers while the bone was drawn over to the left side. At the same time this fragment was pressed down with the fingers, aided by levers and wedges of wood. The muscular resistance to motion was so great that all efforts to bring the fragments into position were ineffectual for a long time, although the left half was drawn steadily over to its own side. But after two hours' effort the parts yielded sufficiently, and a piece of wood was fitted across the roof of the mouth, between the upper teeth, and extending under their crowns. Its lower surface was cut out to receive the teeth of both sides of the lower jaw, and the fractured ends, at the symphysis, were secured by thread passed around the teeth. The patient felt much relieved by this, although exhausted by the pain experienced in accomplishing it, as it was not thought advisable to give anæsthetics. Probably the parts would have come into place readily under their influence, but whether they could have been held there so well afterward is more doubtful.

February 15th. Patient walking round, feeling much better. The halves of the jaw are in comfortable position. The parts near the fracture have improved greatly since relieved from the pressure of the displaced ends of the bone, and the jaw opens wider. Took wax impression of upper and lower teeth, etc. The lower jaw being only imperfectly set, the plaster cast was sawed apart between the central incisors and adjusted by the upper cast. The packthread was still allowed to remain on the lower bicuspid, that the patient might draw the jaw into place, should it settle to the right again.

February 16th. The general condition of the soft parts much improved, but no difference in the right articulation. It is yet impossible to set the halves of the jaw together properly, without bringing the left half down to meet the other. The right condyle, although apparently in its place in the glenoid fossa, is not so, as the back teeth on this side meet too soon, so that the teeth cannot close, at the canines, by about two lines. The *left half* was therefore brought forward at the condyle, *until a full quarter of an inch down at the wisdom tooth and the same at the canine.* In this position, it was set up in the wax resting upon the upper teeth and the bite taken. When the casts were placed in the wax bite, to form the mould for the splint, the upper and lower right wisdom teeth were separated about a line. This was done in the hope that when the splint was applied the parts might yield, so as to allow the condyle to fall away some.

February 19th. On applying the splint the right fragment would not go up into place, even under much pressure, until the part between the crowns of the wisdom teeth was all cut away—showing that no improvement has taken place in the joint to this time. The right wisdom tooth is hard against the one above, while the canine teeth and the other wisdom tooth are considerably below the upper ones. Splint left unfastened.

February 20th. Patient very comfortable, except that the edge of the splint cuts the gum a little. The splint was removed and made easy, then screwed to the first right upper molar and left canine, and to both lower canines. The jaws are held as close together as the back teeth permit, for as all the four upper incisor teeth have been absent for some time, the opening in the splint is large enough without depressing the lower jaw. A channel is cut in each side of the splint, that the saliva from the parotid glands may get into the mouth.

February 24th. Patient very comfortable and much pleased with the splint. All going on well.

March 16th. Swelling set in over right condyle and ramus in the beginning of the month, but passed off. About the same time the part under the symphysis opened, but closed up after a teaspoonful of pus had discharged. The swelling on the neck

of the right condyle is still very painful; doing well in other respects.

March 30th. Swelling all gone, except the small lump near right condyle, which is still painful. Left central incisor (next to the fracture) quite tender, and pus discharging from its socket.

April 12th. Tooth better. Swelling near condyle less painful.

April 22d. Swelling near right condyle much less painful. Splint has been worn sixty-two days, and been on without a moment's intermission just sixty-one days. Removed it and good union found. Upper part of the splint cut off, and the *jaw allowed to move*—the lower part being put on again, as the union is not yet stiff enough. The jaw is therefore left in a splint, like Fig. 1, but still screwed to the canine teeth.

May 18th. Splint dispensed with. Jaw firmly united and the same shape as before the accident. *Also going into its place as regards the upper jaw*, the top of the splint, where the points of the upper teeth rest, having been cut down about once a week since the jaw has been allowed to move. It continued to improve and go up closer to the upper teeth until the beginning of July, when it was nearly in place. The jaw moved very well *up* and *down*, but the right condyle had very little ability to come forward in the lateral movement of the jaw.

September 8th. The patient is out of town; but I have heard from several sources that the jaw is all right.

September 15th. The patient's father says the lateral motion is nearly perfect again, and the jaw in place.

This case shows the necessity of some intervening support between the teeth in some cases during treatment, and therefore affords another argument in favor of interdental splints.

Case 7.—P. N., thirty-six years old, was struck with a club on the left side of the jaw, August 19, 1866. Went to the Demilt Dispensary, from whence he was brought to me, August 22. Find the jaw-bone broken on both sides. The lower lip and parts covering the mental process have little sensation, owing to the separation of the inferior dental nerves. Fracture on the left side, between the bicuspids; it is square across, vertical and smooth. The bicuspid teeth quite firm.

The first downward and forward about four lines from the second. The other fracture is through the socket of the lower right wisdom tooth, leaving one root in front fragment, while the crown of the tooth is held by its back root, in the part attached to the ramus. Fracture passes down, inclining to the angle. The back fragment keeps forward and up, so that the wisdom tooth strikes against the upper teeth, while the forward fragment is full half an inch down when at rest. Much swelling, pain and discharge of pus. The jaw settles over to the right. The teeth above and below are all present, except the lower left wisdom tooth, and pretty firm, except the one in the fractured socket. Both upper and lower teeth show distinctly where their antagonists closed against them. The lower jaw shuts a trifle outside the upper at the *right* bicuspids, owing to a very peculiar curl outward of the *left* angle, which has caused the muscles to swing the jaw over somewhat. The patient says this irregularity was caused by the kick of a mule, when he was about nine years old. Tied the bicuspids together with silk, and took a wax impression of the fourteen teeth, leaving out the elevated wisdom tooth, of which an impression was taken separately. The parts were not precisely placed, therefore the plaster-cast was sawed apart between the bicuspids, and adjusted by the cast of the upper jaw. The wisdom tooth was added in the same way. The lower cast then included the fifteen teeth of the lower jaw, *all in place*. It was placed against the upper cast, and *both set in an articulator*. The jaws were then opened nearly three-eighths of an inch, and a gutta-percha splint made. This was tried in the mouth, and being right was trimmed to the form required for the splint; then, with the upper and lower casts, set in a vulcanizing flask, with the female screws all in place. After the plaster had set the flask was made quite warm, in order that the plaster teeth should not be broken when drawing out the gutta-percha to make room for the rubber. The opening in front of the splint reached from one canine to the other, and from the points of the upper teeth to those below, and holes were made through the sides for the saliva.

August 25th. When applying the splint considerable difficulty was experienced in getting the jaw into place, owing to

the pain and displacement of the fragments; but after placing packthread around the front teeth, and pulling the jaw over to the left, every part went up into the splint, although scarcely as high as they should, the splint being rather tight, because of the improper omission of the two or three coats of silicious varnish usually given to the plaster teeth before packing the soft rubber. The splint was screwed to both canines, on the left side, and to the upper first molar and lower first bicuspid on the right.

August 27th. Swelling and pain lessened very much.

August 28th. All going well; patient wants to know if he may go to work.

August 29th. Parts begin to look natural. Patient sleeps well, except when coughing, through a severe cold.

August 31st. Patient quite comfortable, except when coughing at night. Has begun to work at his trade (glass cutting).

September 5th. Patient has been out in the country to see a sick relative. Removed the splint and cut away some parts pressing too hard on the roof of the mouth. Fractures making fair progress. Took away the right wisdom tooth, it being very loose, as in addition to the loss of one root the tooth had been further loosened by attempts to extract it before the patient went to the dispensary. Replaced the splint.

September 8th. Sensation returning to lower lip, etc. Doing well in every particular. The right back fragment has no tooth to hold it, but the muscles keep it firm against the portion in front.

September 15th. All going on well.

The man was spared much pain by adjusting the casts by the articulator. In fact, it would have been hardly possible to have set the fragments of the bone in place and held them there while taking the impressions and bite, the case being so extremely severe in every particular. All attempts to hold it in place by bandage, even temporarily, were ineffectual.

CASE 8.—I applied the wings of Fig. 3 in the case of a distinguished statesman in Washington, whose jaw was fractured on both sides between the bicuspids.

The injury was caused by falling from a carriage, April 5th,

1865. Unsuccessful attempts had been made to hold the jaw in place by bandages, and also with ligatures on the teeth, by the surgeons first called to the case. On the 14th the patient, while asleep, was attacked by an assassin, and a cut inflicted which reached from under the right zygoma to the left of the trachea. Steno's duct was severed, and the right fracture laid open externally, the bone being also much exposed in the mouth from the original injury.

In accordance with letter of April 14th, from Dr. Wm. Whelan, chief of the Naval Bureau of Medicine and Surgery, in answer to one by Surgeon Bache, chief of the Naval Laboratory, suggesting the use of an interdental splint, and telegrams of the 15th, urging me to come on at once, I started for Washington, and reached the patient's house at twelve, noon, on April 16th. Attending Surgeon, Basil Norris, U. S. A., informed me that the jaw was fractured on the right side, between the bicuspid teeth, and also in the ramus of same side; that the jaw had been bandaged against the upper gum, but this proving insupportable to the patient the bandages were removed. Upon examination I found discoloration caused by the accident still remaining on the right side of the face. A cut (inflicted in the attempted assassination) commenced under the zygoma, passed forward about three inches, then downward and backward an equal distance, to the lower border of the jaw, from whence it crossed over the front of the throat to the left of the trachea. On the skin its first direction fell somewhat from a horizontal line, the second passed down at a little less than a right angle to the first, while the third went forward and downward. These three divisions, of nearly equal length, appeared to have been made by one sweep of the knife. Across the throat the wound was superficial, but above the border of the jaw it grew deeper, as it *split* the cheek—the point of the knife making no entrance into the mouth, except so far as it may be considered to have done so by laying open the right fracture externally, the gum being already lacerated internally from the great displacement of the bone following upon the original injury. The knife was evidently aimed at the throat, but the head being thrown over (the right arm being useless) the cheek and jaw received the brunt of the

blow. No arteries had been ligatured. The wound was neatly sewed up, and healing by first intention, except immediately under the fracture. The swelling and stiffness made the examination difficult, but the ramus proved to be uninjured. There was, however, a second fracture, but on the other side of the mouth, the jaw being fractured on both sides between the bicuspids. The jaw contained all the ten forward teeth. The right wisdom tooth and root of the left were all that remained back of the bicuspids. The part in front, containing eight teeth, was drawn down out of place, while the right back fragment, with the wisdom tooth and second bicuspid, was drawn up, showing its fractured end white and bare. The fracture was square across, vertical and smooth, and the parts were separated vertically over a quarter of an inch when at rest, sometimes much more. On the left side, the first bicuspid fell forward and downward from the second one-quarter of an inch. This fracture passed forward somewhat in descending. Here the bone could not be seen, as the gum had separated from both teeth and lay swollen over it. Pus discharged profusely from both fractures. The gum was pale and flaccid, in keeping with the general condition of the patient. The upper jaw was entirely without teeth. Deeming it important to set the exposed bone in place as early as possible, and also to give the patient time to recuperate—as he had already been subjected, during the morning, not only to a relation of the President's death, but to much that was said and written upon the subject—I obtained the patient's artificial teeth, intending to cut out the front teeth, and tie the lower natural canines to the upper artificial ones. In this way the back fragments would have been kept down in place, and in return would have held the artificial teeth up against the roof of the mouth. They could have been used therefore to support the front of the lower jaw temporarily, without assistance from bandages, which were not only inadmissible in consequence of the wounds, etc., but would have increased the tendency to necrosis by interfering with the circulation. But the patient's experience with the teeth had not been such as encouraged him that he could bear them in his mouth. It was therefore necessary to leave the parts as they were until the next morning.

In the afternoon, while explaining the treatment proper for the case to Dr. Whelan, I also stated my unwillingness to commence, except with the understanding that I should control it entirely.

April 17th. Was informed, by Surgeon Norris, that the friends of the patient were unwilling to have the splint fitted to the jaw at present, and that the surgeons agreed with them.

Upon giving my views to the contrary, Dr. Norris came over to my opinion. I consented to wait until the following morning, when it was finally decided not to proceed in the matter. I protested, in vain, but promised to return when sent for.

April 28th. Arrived in Washington; Surgeon-General Barnes informed me that the jaw was more displaced, but the patient otherwise much improved. I found the sensation of the right side of the forehead, face and lips deficient. The separation of the inferior dental nerve by the displacement of the bone, and of branches of the facial nerve, by the knife, did not seem sufficient to account for it. There was also irregular motion in the right eye. The front of the jaw was lower, and the right back fragment showed its alveolar to a greater extent. There were no indications of any tendency to union on either side. The fragments could be put precisely in place, no splinters or any thing else intervening. There was little swelling, but great discharge of pus. Took wax impression of upper jaw, and removed the tartar from lower teeth.

April 29th. I set the jaw, and held it in place by wire and silk ligatures, as described in pages 434 and 435 of last number. Took a wax impression of the teeth and gum, and obtained the bite directly from the teeth, etc.[1]

April 30th. Patient felt much relieved, as the ligatures held the front of the jaw up well. Tried in a gutta-percha splint, arranged the wings in it, removed it carefully from the mouth, placed the upper and lower casts and female screws in it, and set them in a vulcanizing flask.

Although the front of the jaw containing the eight forward

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[1] In doing this, and in making the splint, I was assisted by Mr. J. Adams Bishop, who accompanied me from New York.

teeth was greatly displaced (before the setting), the silk and wire ligatures held well until May 2d, when they were removed and the splint applied. It was of hard, vulcanized rubber, covered the roof of the mouth and adjacent gum, inclosed all the lower teeth, and went down over the gum on the outside somewhat. The opening in front was seven-eighths of an inch wide, and half an inch high in the centre, the wings preventing any more room sideways, as they were set clear of the commissure of the lips. To have given more room in the height, by depressing the lower jaw, would have made it very difficult to prevent the saliva from overflowing at the lips. Upon putting in the splint the breathing was very spasmodic for several minutes, but this soon passed off, and I screwed it fast to the lower teeth. They held it against the upper gum for the first night, but after that a cap, with adjuncts, as in Fig. 3, was worn to support the splint. The upper wings only were used, as the lower jaw was held up in the splint by screws passing into the lower canines. The mental band was consequently not applied, although the lower wings were left on in case of need. The upper wings being kept clear of the zygomas, the parts around the jaw and face were left free from pressure—this being important, in order that the vascular and nervous circulation should be unimpeded. After giving the excellent army nurses who were in attendance upon the patient full direction for keeping the splint clean in the mouth, and properly balanced by the cap, which I had fitted to the head, I left Washington, May 3d.

Arrived in Washington again on the 8th, having received a telegram saying that the patient was suffering much pain. Found him quite comfortable, talking freely, and much encouraged. Saliva had accumulated several times in the cheek, but had been let out by lancing externally. The splint had been kept quite clean, and as every thing was going on well I left on the 9th.

June 11th. Saw the patient again. The left side appeared to be well united, but the right gave no indication of union, although the wound under it was nearly closed, the last of several pieces of bone having been removed some days before.

I promised to remove the splint in four weeks from that date to examine the parts.

This splint held the jaw firm for sixty-eight days, when I removed it.

There was good union on the left side, but the right fracture was still ununited. For this, however, I was prepared, as the bone had been exposed so much during the twenty-four days which elapsed before I set it, and the saliva from the right parotid gland had discharged through the fracture from a short time after the attack. These unfavorable conditions, with other depressing circumstances, associated with an enfeebled condition from loss of blood, had been followed by necrosis of the ends of the bone on that side, and several pieces had come away externally during the first six weeks from the time the splint was applied, and also a long piece from the inside of the jaw on the left side.

I now removed the necrosed alveolar of the second bicuspid, but left the tooth in, as it appeared to have healthy connection with the lower part of its socket. The other teeth had grown firm. The splint had not been off the jaw a moment since its first application, and therefore little examination had been made internally, but external appearances had indicated that the saliva followed the course taken by the point of the knife. At this time, July 9th, Steno's duct proved to be completely closed. I could not pass the smallest probe even into its mouth, and the saliva discharged wholly through the ununited fracture.

Upon removing the first splint I immediately put another upon the teeth. This splint was ready for application, having been made on a cast taken from the original impression. This second splint was like Fig. 1. It covered all the teeth and gum, and was worn from July 9th to August 4th, when I removed it and put on a splint which allowed all the teeth to be seen, except the wisdom tooth on the right and the root on the left side, upon which it rested. This splint was worn screwed to the canines, until the beginning of September, four months from the application of the first splint. I saw the patient several times during the month of October. The jaw seemed to be

getting firmer on the right side. On the left it was then quite strong, and all precisely in place.

The patient talked freely while wearing the splints, except for a few days at the commencement. From the time the second was applied the jaw has been used for eating.

In letter to me of March 29, 1866, the patient says: "The whole jaw moves quite well and firmly. Thus at last I begin to regard my cure in that respect complete."

I have not seen it myself since October, 1865, therefore cannot speak of it by personal observation.

Of the splints spoken of in this paper, with their wings and other appliances, I am enabled to give most decided assurances of their perfect adaptability to the purpose for which they were devised.

Having personally experienced their great advantage, and believing them to be superior to all other treatment, I have endeavored to make the application of them as easy as possible, desiring that others, whether practitioners or patients, may have the benefit of their use, when necessary.

On Inhalations in the Treatment of Diseases of the Respiratory Passages, particularly as Effected by the Use of Atomized Fluids. By J. M. DA COSTA, M.D., Physician to the Pennsylvania Hospital.

(Continued from the September No. of this Journal, p. 416.)

In the preceding considerations, and while discussing the mode of applying the medicated spray, it has been assumed that this can be made to reach not only the fauces and pharynx, but the respiratory channels. Now, with reference to the former point there can be no question, but much skepticism has prevailed as regards the entrance into the air tubes of the atomized fluid; and before passing on to indicate the uses of these agents, it is incumbent to inquire into the evidence on which it has been assumed that they penetrate into the lungs, or even into the larynx. Not to mention further the well known facts alluded to in connection with the coal miner's

lung, and which have a strong bearing on the subject, the evidence of fine particles reaching the air passages is of two kinds: first, that furnished by demonstrative experiments made on animals and man; and, secondly, that attained by perceiving the effects of inhaling the atomized liquid, particularly its prompt effect in producing or allaying spasm, in checking hemorrhage and the like.

To the first category belong the interesting experiments of Demarquay, which, repeated in the presence of Poggiale, were used by him as the basis of his able report to the French Academy. Dogs and rabbits, with their mouths forced open and their nostrils closed, were made to inhale for five minutes a pulverized solution of perchloride of iron, of the strength of 1 part of the iron to 100 of distilled water. The animals were afterwards killed, and throughout the larynx, trachea, bronchial tubes, and even in the lung structure, the presence of the persalt of iron was clearly detected by the production of Prussian blue with the ferrocyanide of potassium and acetic acid. But it was objected to these experiments that they were made on animals, and that all the circumstances were such that it was unfair to infer that the same results could be obtained in man. To meet these clamors, Demarquay experimented on a nurse at the Hospital Beaujon, who breathed through a canula in her trachea. She inhaled a pulverized solution of tannin while the tracheal opening was closed with a slip of paper, moistened with a solution of perchloride of iron, and held in place by means of a strip of sticking plaster and a napkin. After inhaling for a minute the sticking plaster and the paper were removed, and a strip of paper impregnated with a solution of perchloride of iron was pressed, with the aid of a delicate forceps, into the trachea. In the first two experiments there was no reaction; in the third the black discoloration of the paper proved that the solution of tannin had entered the air passages. Fieber, in Vienna, repeated the experiment on a man twenty-two years of age. It only succeeded on the fourth attempt. A few months since I tried it three times on a man about twenty-six years of age, a patient under my charge at the Pennsylvania Hospital. He had cut his throat in an attack of mania a potu three months

before he came under my observation, and wore a canula. I made him, after removing the canula, and while closing the tracheal opening with the finger, as done by Demarquay in his third,[1] the successful experiment, inhale, for nearly two minutes, and by means of a steam atomizer, compound solution of iodine, 15 drops to the ounce, and then passed a thoroughly starched linen rag into the opening. No satisfactory reaction was perceived; neither was it when a canula, covered on its upper surface with a starched piece of linen, was employed. Nor was an experiment with tannin and chloride of iron more successful. A laryngoscopic examination showed the cause of failure. The false vocal cords were tumid, greatly engorged, rigid; and the motion of the cords was hardly perceptible even when the man, while the tracheal opening was closed, was doing his best to breathe through the mouth. They were scarcely dilatable, though after a course of laryngeal catheterization they became so.

The difficult success of Demarquay and Fieber, the total want of success of Fournié, who experimented on the case of Demarquay, were chiefly due to the great difficulty of completely closing (owing to the anatomical relations of the parts) the tracheal opening—an indispensable condition for success; and to the inability of the patient to remain but for a very brief period deprived of the canula. In this respect my case was better suited, yet it presented other and greater obstacles. In truth, a union of all conditions favorable to complete success is rare; hence, while we may claim the positive results obtained as conclusive, the failure to obtain these results, it is evident, is not equally so.

Still, though we can very rarely on man demonstrate to the eye the passage of atomized fluids down the trachea, it is easy to satisfy ourselves of their entrance into the larynx. This observation which I have made will prove it. Let a person inhale pulverized distilled water, to which some drops of a solution of blue or red aniline have been added. Let him then be immediately examined with a laryngoscope; an intense color, visible on the vocal cords and at the beginning of the trachea, will show where the aniline has reached. Bataille,[2]

[1] Die Inhalation, etc., 1865. [2] Gazette Hebdom., 1862.

inhaling a solution of rhatany, noticed on himself, by means of the laryngoscope, the red discoloration of the larynx and trachea. He also expectorated for a whole day subsequently a reddish sputum, which, from its character, he believes to have proceeded from the bronchial tubes.

Yet another demonstration of the penetration of the atomized liquid is furnished by post mortem inspection of pathological processes. A number of the rabbits Demarquay experimented on, and which were not further interfered with after they were made to breathe the solution of the perchloride of iron, died of pneumonia, generally of very circumscribed kind. Trousseau reports the same consequence from inhalations of tannin in a lady, who, finding herself benefited by them, inhaled for several hours daily until a fatal pulmonary inflammation supervened. Still more significant are the cases reported by Lewin and Zdekauer. In Lewin's case, inhalations of chloride of iron were used to arrest a hemorrhage from the lungs. The patient soon afterwards died, and little particles of iron were found by Schulz, the chemical assistant of Frerichs, in a cavity in the upper lobe of the right lung.[1] In the similar case of Zdekauer,[2] the Russian professor, assisted by Holm, detected a far larger quantity of iron everywhere in the tissue of the lung than appertains to the blood it contains.

These facts, some of which were elicited and dwelt upon in the report and discussion before the French Academy, and which convinced, as we may judge by the adoption of all the points of the report, that critical body of the penetrability of atomized fluid, can leave then no doubt on the subject. But there is another matter, which it seems to me may be advanced as evidence, namely, the immediate effect perceived from the inhalation of certain articles. For instance, if cold water be inhaled a sensation of cold in the larynx and trachea, extending thence into the chest, is very common. Many articles in strong solution, and tannin may be mentioned among them, give rise to a feeling of oppression and of violent burning in the chest. From the inhalation of a strong solution of alum I have seen on two occasions asthmatic, wheezing breathing very speedily produced, with loud dry rales discernible at various

[1] Inhalations Therapie, p. 190.

[2] Quoted in Wiener Med. Wochenschrift, 1861, No. 30.

parts of the chest; the attack lasted for eight or ten minutes. Further may be mentioned what, in a patient under my care, affected with bronchorrœa, I have repeatedly observed, the sense of tightness in the chest attended with a very greatly, I might say, immensely diminished expectoration very soon after inhaling any strong astringent solution, particularly of alum or of tannin.

The question of the pulverized fluids reaching the respiratory channels is thus, to any unprejudiced mind, no longer one of unbelief. But it still remains to be solved how much of a given solution arrives there, and what proportion finds its way into the deeper textures. Again, is the temperature a modifying agent; do chemical changes take place in the atomized liquid when inhaled; and under what circumstances is the passage of the spray prevented? To enter into these questions at any length would necessitate long and tedious discussion, involving allusion to many chemical and physical laws. Let me merely state that, though attempted to be solved by Waldenburg, with great care, we do not know how much of the fluid gets into the respiratory structures; and that we shall have to decide its passing in any quantity chiefly by physiological and therapeutic experiments. Chemical reactions only take place in certain articles pulverized, as in sulphurous waters. The temperature of the stream varies with the temperature of the surrounding atmosphere, the apparatus employed, the distance of the patient from the spray-producing tubes, and the temperature of the fluid to be pulverized. Bearing this in mind, we can ordinarily regulate the heat of the stream without much difficulty; and in point of fact it must always be recollected that it takes very readily and speedily the temperature of the surrounding air. Practically, therefore, the subject of the temperature of the spray does not occasion much perplexity. The spray from a steam atomizer is warmer, particularly when inhaled rather near to its point of production, and from its comparative warmth is generally more acceptable to the person inhaling.

With regard to the circumstances interfering or preventing the passage of the spray into the respiratory passages, I have already alluded to the intensity of the current. I may add that

breathing through the nose; the tongue not being sufficiently depressed; the head being inclined forwards; and all other postures which would change the angles favorable to the progress of the pulverized fluid, or interfere with the freedom of respiration, are obstructing elements. I have tested these points experimentally by letting a man breathe an atomized solution of aniline in conditions unfavorable to the entrance of the spray, and have then examined him with the laryngoscope to obtain a view of the discolored laryngeal membrane. I found that though he may be kept inhaling steadily for four or five minutes, there is scarcely a perceptible alteration in color at the beginning of the respiratory passage, and it is therefore highly improbable that any of the pulverized liquid should have passed lower down. Many of the negative experiments, whether on man or on animals, have been, I think, clearly due to a neglect of the points mentioned.

It was necessary to discuss these hindering causes, because it was necessary to inquire in how far we could guard against them, and while showing that they might explain some of the discrepancies of different observers, to make evident their bearing in ascertaining the doses of medicine required for inhalation. In truth this question of doses is one far from easy to determine, and can only be fixed experimentally—can, in other words, only be settled by a careful study of respiratory therapeutics, in which due importance is attached to the sources of fallacy indicated, and in which they are avoided. Moreover, the dose varies with the apparatus; or rather, though the dose be the same, to obtain that dose in the mouth we may have to use more of the medicated fluid or a stronger solution with one atomizer than with the other. Thus, in the apparatus of Bergson, it takes, according to a calculation of Lewin—whose own glass atomizer is, however, still more wasteful of the medicated liquid—eight ounces of fluid, which quantity can be pulverized in from twelve to fourteen minutes; to insure, therefore, three ounces of spray reaching the oral cavity, we must use in amount of solution nearly three times the dose required. In Siegle's steam apparatus, one ounce is atomized in about the same time, and perhaps not more than a fourth is lost, but the steam dilutes the solution pre-

pared by nearly one-half; a solution in the cup of ten grains to the ounce would therefore be reduced by the vapor to between five and six grains to the ounce, and of this about four grains would be really inhaled through the mouth.

Speaking generally, the dose to be given does not vary materially from that employed internally. But, with reference to narcotics, this does not hold good, as they are readily absorbed and act efficiently in smaller doses. Concerning astringents, too, though they are often employed in doses approximating in their strength those for external use, when designed to reach the deeper structures, we must, bearing in mind the delicacy of these textures, carefully graduate the dose. Any agent which is soluble in water, or in a watery infusion of an aromatic, or in very dilute alcohol, can be used by an atomizer. Substances soluble in glycerine, or capable of being suspended in thin emulsions, too, may be employed, but not, as a rule, satisfactorily. I now subjoin a table, in which the dose is calculated to the ounce of water, for any form of steam atomizer throwing a fine spray. It represents the articles which have been most employed, and there is scarcely one in the table that I have not used in the doses mentioned. Where the dose is not stated from personal knowledge, or where a particular kind of application is alluded to, I have added the name of the observer. I have also indicated the pathological conditions to which the doses are suitable.

TABLE OF DOSES FOR INHALATION.

ALUM, 10 TO 20 GRAINS.—In this dose suitable to chronic catarrhal affections of pharynx and air tubes, particularly in bronchial affections with excessive secretion, when, as in most inflammatory conditions of respiratory mucous membrane, it may be advantageously united with opium. In rather larger doses, 30 grains to the ounce, useful in pulmonary hemorrhage. Is, as an astringent, generally more of a sedative and more suited to conditions of irritation than tannin. (Fieber.)

TANNIN, 1 TO 20 GRAINS.—Useful for the same affections as alum. Employed in cases of laryngeal ulceration and excrescences, in œdema of the glottis (Trousseau), in croup. Here, as well as in pulmonary hemorrhages, in large doses. In ordinary cases of laryngeal or bronchial disease, begin with a small dose. If the remedy occasion much heat and dryness, it is not to be employed.

IRON (perchloride of), ½ TO 2 GRAINS.—In earlier stages of phthisis. In

chronic pharyngitis or laryngitis may be used stronger. As a weak inhalation in hysterical aphonia. Of greatest strength in pulmonary hemorrhage, 2 to 10 grains to the ounce, or 10 to 40 m. of Monsel's salt to the ounce. The lactate, citrate or phosphate may, in ordinary cases, in which we wish a non-astringent salt of iron, be also used, though they are not, on the whole, as available as the chloride.

NITRATE OF SILVER, 1 TO 10 GRAINS.—In ulcerations of pharynx and larynx, in follicular pharyngitis. A face shield is always to be used. 10 grains to the ounce only in cases of ulceration.

SULPHATE OF ZINC, 1 TO 6 GRAINS.—In bronchial catarrh with excessive secretion. In aphonia, connected with chronic laryngeal catarrh.

CHLORIDE OF SODIUM, 5 TO 20 GRAINS.—Promotes expectoration and diminishes sputa; and employed in phthisis.

CHLORINATED SODA *(Liquor Sodæ Chlorinatæ)*, ½ TO 1 DRACHM.—In bronchitis, with offensive and copious expectoration; in phthisis.

MURIATE OF AMMONIA, 10 TO 20 GRAINS.—In laryngeal and bronchial catarrh, acute as well as chronic. To promote expectoration; also in capillary bronchitis. The dose best borne is not above about 10 grains to the ounce, though as much as two drachms to the ounce have been employed. (Siegle.)

OPIUM (watery extract of), ¼ TO ½ A GRAIN.—In irritative coughs, and as an adjunct to allay irritation. Also for its constitutional effects. Dose of tincture of opium 3 to 10 drops. Acetate of morphia one-twelfth to one-eighth of a grain has been administered, but large doses require much caution.

CONIUM (fluid extract of), 3 TO 8 MINIMS.—Irritative cough; asthma; feeling of irritation in larynx.

HYOCYAMUS (fluid extract of), 3 TO 10 MINIMS.—Spasmodic coughs; whooping cough. One-half a grain of the extract, gradually increased, or the tincture may be employed.

CANNIBIS INDICA (tincture of), 5 TO 10 MINIMS.—In spasmodic coughs; phthisis.

IODINE *(Liq. Iodinii Compos.)*, 2 TO 15 MINIMS.—In chronic bronchitis; in phthisis.

ARSENIC *(Liq. Potass. Arsenit.)*, 1 TO 20 MINIMS.—Nervous asthma. (Trousseau.)

TAR WATER, 1 TO 2 DRACHMS of officinal solution.—In offensive secretions from bronchial tubes; in tuberculosis; as an antiseptic in gangrene of lungs.

TURPENTINE, 1 TO 2 MINIMS.—In chronic bronchitis with offensive secretions; in bronchorrœa; in gangrene of lungs.

LIME WATER, used of officinal strength, or stronger.—In diphtheria; in membranous croup.

WATER, Distilled.—Cold, in pulmonary hemorrhage. Warm water in asthma, in croup; in bronchitis.

It is always preferable that the solutions should be made by the addition of distilled water; and it saves much annoyance in the working of the atomizer if some of them—for in-

stance, those of tannin—are strained. In some cases the dose recommended cannot be borne at first. It is, indeed, always best, excepting if the prompt action of a narcotic be needed, to begin with small doses, and educate, as it were, the respiratory mucous membrane to tolerance.

As the mode of using inhalations and the general questions connected with their employ have now been considered, we may turn to the more strictly clinical part of the inquiry, and examine, by the light of observation, into their real value as a therapeutic means. In so doing I shall only be able to discuss the applicability of the atomized fluids to the treatment of some of the principal diseases of the respiratory organs; for to do otherwise would be to write a treatise on respiratory therapeutics rather than an essay bearing on the subject. Nor can I introduce in detail all the material I have collected even on the matters brought forward, but shall allude only to such parts of it as are the most significant, embodying, however, all in any deductions made.

And first, to look at *laryngeal affections*. Here I have found atomized liquids of most service in the catarrhal conditions, whether connected with pharyngitis or not. In the loss of voice and irritative cough associated with *catarrhal laryngitis*, not, however, while in its most acute stage, I have repeatedly known inhalations of alum, about ten grains to the ounce, combined with five to six drops of laudanum, or with conium, produce a most happy and soothing effect, and exert sometimes an almost immediate influence on the voice. Thus, in a case of ten days' standing, in an elderly gentleman, the voice became after each inhalation, two to three being employed daily, quite distinct, though at first it resumed its whispering tone between them. In a few days a permanent result was perceptible. Inhalations of pulverized warm water, with or without narcotics, are very grateful in the acute or subacute catarrhal conditions, since they relieve greatly the sense of dryness and of heat. In the more chronic cases, and when marked swelling of the mucous membrane of the larynx and vocal cords is perceptible, the effects of the inhalations are not always quickly evident; but in these cases, too, I have used alum, tannin, sulphate of zinc, or the subsulphate of iron, with great

advantage, commencing with small doses. For instance, I was consulted by a clergyman who had strained his voice by incessant speaking, and had in addition caught a severe cold. His voice, from having been one of remarkably fine compass, had become coarse, and was at times so hoarse as to be whispering. The laryngeal mucous membrane was much congested, and there were a few rales in the chest from accompanying bronchitis. He coughed much, complained of an uneasiness in the throat, and was rather short of breath; otherwise no symptoms of any disorder existed. He had tried for three or four weeks various internal medication, without benefit. I directed him inhalations of tannin, five grains to the ounce, subsequently somewhat increasing the strength. After the sixth inhalation his voice improved most strikingly, and it continued to improve for ten days, at which time he left the city. When not endeavoring to speak too loud the voice was quite clear, and had regained its natural tone; the cough had almost ceased.

From the subsulphate of iron I have seen similarly good and even prompter effects. Not long since I employed it in a case in which great swelling of the epiglottis existed, concealing to a very considerable extent the structures within the laryngeal aperture, and attended with much difficulty in swallowing and aphonia. The disorder had lasted for more than two months, and the loss of voice had been gradually progressing, until, five days before I saw the patient, the voice had been reduced to a mere whisper. Several drachms of a solution of Monsel's salt, sixteen minims to the ounce, were injected by a hand-ball atomizer, and before the young man left the office his voice was distinctly audible. He came back two days afterwards, speaking quite plainly, and stating that he had been able to swallow solid food, the first for weeks. The inhalation was repeated, and both voice and power of deglutition again markedly improved. Subsequent examination with the laryngoscope showed the most evident reduction in the tumefaction and change in the color of the engorged structures.

In the various forms of *ulceration* of the laryngeal structures, the method of treatment under discussion has been applied by means of pulverized solutions of tannin, of corrosive sublimate, of iodine, of iodide of silver and of nitrate of silver.

I have used tannin, sulphate of copper and nitrate of silver in several cases, but have not been struck with the good results. For example, in a gentleman, forty-two years of age, on whose right false vocal cord the laryngoscope detected an ulcer with irregular borders, inhalations of the compound solution of iodine, commenced with 10 drops to the ounce and gradually increased, were faithfully tried for fully three weeks without any perceptible benefit being produced. Subsequent touching with nitrate of silver, the hand being guided by the reflected image of the parts in the laryngeal mirror, proved far more effectual, both in the improvement manifest in the ulcer and in the symptoms of impairment of voice, difficulty in swallowing and cough. The ulcer, judging from the history of the case, was probably scrofulous. In the following case of laryngeal ulceration the treatment by inhalation was also fully tried.

A man, forty-five years of age, was admitted into the Pennsylvania Hospital on the 13th of February of this year, with a cough which he traced to exposure dating eight weeks back, though when questioned he stated that he had a very slight dry cough, off and on, for a month previous to this. The severe cough accompanying the cold he caught was attended with sore throat, and soon afterwards with hoarseness. On admission he was noted to be pale and to present a sickly aspect; respirations 24; expectoration but slight in quantity, tough and whitish; and neither fever nor deficient appetite. No abnormal physical signs were discernible in the lungs, save a slight harshness at the lower part of the left. There was difficulty in swallowing, without pain on pressure over the larynx; the voice was hoarse, but not completely lost; the fauces were not reddened. On laryngoscopic examination a large superficial, yellowish ulcer was seen on the right false vocal cord, extending to the ary-epiglottidean fold. There was also considerable thickening of these structures as well as those of the left side, but the true cords seemed unaltered and approximated fully in the act of vocalization. The man denied the existence of any syphilitic taint.

On the 26th of the month, having since his admission had his larynx touched several times with nitrate of silver, besides taking tonics, he was directed to use daily inhalations of alum,

30 grains to the ounce. On the 9th of March this treatment was stopped, and he complained of his throat feeling very sore—an occurrence which, with a sense of oppression and tightness and an aggravation of the cough, I have several times noticed from the use of very strong solutions of alum. Finding, on examination with the laryngoscope, ulceration beginning on the other cord, and perceiving no amelioration in any of the symptoms, the alum solution was not resumed, but sulphate of copper inhalations, $2\frac{1}{2}$ grains to the ounce, were substituted. On the 18th, as they had produced no effect on the ulcers, though the swelling was less, the strength was doubled, and he inhaled an ounce of the solution daily without any inconvenience, though twice it made him sick at the stomach. His general condition was not satisfactory, and in addition to iodide of iron and an anodyne cough mixture, he was placed on cod liver oil, a tablespoonful three times daily. A few days afterwards an examination of the chest showed coarse, dry rales in expiration in both lungs, and a more high pitched percussion note with greater resistance at the right apex. The coarse, dry rales were there, too, more distinct; there was more cough, followed by a frothy and copious expectoration; and, altogether, it was evident that a tubercular infiltration into the lung was taking place. From this time on the history was that of a well developed case of phthisis. He had much cough and profuse expectoration, with rapidly progressing emaciation, and then night-sweats. The dry rales gradually disappeared, giving way to harsh breathing, and a month after the note last mentioned signs of softening were clearly discernible at the right apex.

But to return to the laryngeal symptoms and their treatment by inhalations. The inhalation of copper, which was kept up until the 26th of March, considerably lessened the frothy expectoration and reduced the swelling, but it did not put a stop to the progress of the ulceration. Nitrate of silver, with a brush, was then several times used, and on the 7th of April two fluid drachms and a half of a solution of nitrate of silver were administered by means of the hand-ball atomizer. The injection produced a burning sensation, lasting two hours, and a decided abatement in the cough. But on the 9th the ulceration, instead

of decreasing, was found to have extended to the right true vocal cord, which was decidedly excavated on its margin; a few isolated, yellowish spots were also seen on the wall of the trachea. The poor man had much difficulty in swallowing, but had not completely lost his voice.

From the 9th to the 16th of April, he took, with the steam atomizer, six inhalations of nitrate of silver, half an ounce at a time, of the strength of fifteen grains to the ounce. Twice, after inhaling, he was sick at his stomach. Subsequent to each inhalation, it was noted that his larynx smarted for an hour; but for a few hours the expectoration ceased. From this period on until he left the hospital, April 30th, and very shortly before his death, the inhalations were not regularly kept up. A few local applications were made by means of a sponge, and he expressed himself always as being relieved by them. His increasing weakness caused him to prefer them to the inhalations. But nothing really gave him much relief; the difficulty in swallowing was so great that he had to be nourished exclusively by fluids; there was tenderness on pressing between the hyoid bone and larynx; the cough was very annoying, and the sputa, no longer so frothy, were obviously nummular; the voice was reduced to an almost inaudible whisper. The last laryngoscopic examination, made after the inhalations had been stopped, showed that the ulceration had greatly altered the true cords. The false were less swollen, and the ulcer on them had not increased, but an ulcer was also seen on the outer edge of the left arytæno-epiglottidean fold.

In reviewing this singular case, we are struck with the sudden beginning of the affection in the larynx and with the laryngeal phthisis, preceding that of the lungs. But this point of the case cannot be here discussed. I have introduced it rather to study the effects of the inhalations; and though these were, on the whole, of service in reducing the swelling, and even perhaps in influencing favorably some portions of the ulcers, and though thus we may claim that a certain degree of comfort was procured, it cannot be said that either the sulphate of copper or the nitrate of silver arrested the extension of the ulceration. Nor were the results obtained by the latter agent greater than those produced by the local application of

nitrate of silver with a sponge or brush. In simple ulcers inhalations may be of more decided use; though even here I prefer, so far as I have tested the matter, the other method of local treatment.

In *œdema of the glottis* tannin has been greatly lauded by Trousseau. In the first volume of his Clinique Médicale he records a case in which a strong solution of tannin was inhaled every hour, with the most obvious effect on the attacks of suffocation, and indeed on the disease. During the second day there was but one fit of suffocation, and the respiration had lost its noisy character. The attacks recurred once in twenty-four hours for three days, but on the fourth day of treatment the respiration was natural. The young woman left the hospital a few days afterwards, perfectly convalescent.

The same treatment, too, proved successful in the hands of Barthez,[1] at the Children's Hospital, St. Eugéne, in *laryngeal diphtheria* and in *croup*. He cites four cases in which a tannin solution, from five to ten per cent. strong, was inhaled from eight to twenty times in the course of twenty-four hours, each inhalation lasting from fifteen to twenty minutes, and being always followed by evident temporary relief. Two of the children recovered, the other two died. But the autopsy proved that the false membrane had entirely disappeared. Death was due to the diphtheritic poisoning. The results of the tannin inhalation are attributed by Barthez to the astringent effects of the tannin on the membrane, which, when corrugated, rolls up at the edges, and is thus prone to be gradually detached. But Fieber, who treated fifteen cases with tannin solution much in the same manner, and who reports ten cures among them, attributes the success to the dissolving influence of the remedy. Yet, when we come to examine critically the instances recorded by Barthez, the former supposition becomes far the more probable. Thus, in analyzing his cases, I find that the first was sick for five days before admission, and seven days under treatment, making, so far as can be judged from the record, from nine to ten days that the membrane lasted. In the second case the treatment did not begin until the second

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[1] Traitement des Angines Diphtheritiques par la Pulverisation. Paris, 1861.

day of the sickness; the child died on the twelfth day. In the third case, which seems to have been one of pseudo-membranous croup rather than of laryngeal diphtheria, the treatment commenced on the fourth day of the malady, and by the ninth day the little patient had recovered. The fourth case was eight days sick when the treatment by inhalation began, and was subjected to it for four or five days before full recovery took place. Now this does not look like any marked solvent power of the remedy, for diphtheritic membranes are not permanent structures, but are very apt to disappear from the circumference to the centre within a week after their appearance. Hence, if we accord any value to the treatment—which, bearing in mind the usually fatal character of laryngeal diphtheria and the grave character of pseudo-membranous croup, we cannot totally refuse to do—we must also admit that the action is not rapid, and not what we might expect from a solvent. Nor can we overlook the effect of the water in the combination as a cleansing agent, and as tending to aid in removing and in expectorating the breaking down textures; for Siegle[1] used inhalations of pulverized warm water alone in a case, apparently hopeless, of membranous croup, with the greatest relief to the child, and with the result of causing it to expectorate with the dense mucus shreds of the membrane. The child recovered.

But to return to *diphtheria*. Other agents besides tannin have been resorted to, to counteract its local manifestation, both when the larynx is implicated and when the membrane has not extended to it—chloride of iron, chlorate of potassa, alum. Lewin[2] has reported at length fifteen cases, eleven of which recovered. I have analyzed these cases, and find the following result. But in four of the eleven that recovered (Cases IV., VI., VII. and XI.) was the larynx implicated, and in these four the membrane was chiefly on the upper surface of the epiglottis. Only in one, Case XI., did it extend to the under surface of the epiglottis and to the arytenoid cartilage. Of the four fatal cases the larynx was in three very decidedly

[1] Hals und Lungenleiden, 1865.
[2] Inhalations Therapie, 1865.

affected. This result is therefore by no means remarkable, particularly as cauterizations and internal remedies were at the same time used. Indeed Lewin himself speaks more of the action of the inhalations in preventing the membranes from reforming than of their power to remove those already formed.

Yet another remedy that has been recommended, both in diphtheria and in croup, is lime water. Küchenmeister and others have found that the pseudo-membrane was soluble in concentrated acetic acids, in alkalies, in carbonate of lithia, but with greatest readiness in lime water, and the attempt has been made to employ this by atomization as a solvent. Biermer[1] was the first to use it. The patient was a girl, aged seventeen, admitted into the hospital at Berne for croup, which had lasted for four days; the suffocative phenomena were very marked. To moisten the respiratory passages pulverized water was tried, first warm, then boiling. After inhaling an hour, with much comfort, vehement coughing occurred, whereby a quantity of mucus and shreds of false membrane were discharged, causing decided relief. This became still more evident when warm lime water (one part of lime to thirty of water) was used with the pulverizer every second hour, each inhalation lasting a quarter of an hour. Thick, purulent matter and crumbling pieces of membrane were expectorated, and the signs of laryngeal obstruction gradually disappeared.

Biermer insists on the necessity of using the inhalations hot. Dr. Küchenmeister and Dr. Brauser[2] have each published a successful case treated in the same manner, and a substitute for the pulverized inhalation has been attempted in this country by Dr. Geiger, who poured hot water on unslacked lime, and caused the steam arising from it to be inhaled. He reports several cases of pseudo-membranous croup with a fortunate issue.[3]

Not having tried atomized lime water in croup or in laryngeal diphtheria, I cannot speak from personal experience either of its effect or want of effect. But I have watched, in two

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[1] Schweizerische Zeitung für Heilkunde, 1864.

[2] Referred to in British and Foreign Med. Chir. Review, July, 1865.

[3] Medical and Surgical Reporter, April, 1866.

cases of diphtheria, with some care, the action of lime water on the visible deposits.

In the first case, that of a lady, seen in consultation with her physician on the fifth day of her confinement, the deposit covered the roof of the mouth, the half arches and part of the wall of the pharynx. There was also, and indeed the progress of the case placed the matter beyond doubt, reason to believe that nasal diphtheria existed. She was taking chloride of iron, full nourishment and stimulants. I directed a stream of pulverized lime water about eight times stronger than that officinal in our pharmacopœia—the liquor calcis saccharatus of the British pharmacopœia—on the affected part, by means of an excellent hand-ball atomizer, for three or four minutes at a time. This treatment was carried on every few hours, but no perceptible influence on the membrane could be detected. The application was cleansing and very grateful, particularly so when thrown up the nostril. And here let me, in passing, state that the spray was felt to arrive in the throat, and that though the remedies we resort to may not succeed in dissolving the membrane, I beg to draw attention most earnestly to this use of the atomizer in nasal diphtheria, and particularly in the nasal diphtheria of children, as an excellent means of acting locally on the affected part. But to return to the case. It terminated fatally, the membranes in the mouth remaining in a very thick layer.

The second case was that of a gentleman, thirty-five years of age. Here there was no nasal diphtheria, nor were the constitutional symptoms by any means so grave; and after the disappearance of the membranes, which took place in about nine days, convalescence was rapid. As local treatment, early in the affection, a strong solution of sulphate of copper was employed. But I also, both at the time and afterwards, made use of atomized solutions of lime, in the same manner as in the preceding case, and not hot. The remedy was again very grateful and cleansing; yet, though I selected repeatedly the same spot on the left half arch to throw the solution on, I could not see that it had any perceptible effect in thinning the deposit.

If lime water be then a solvent of the membrane on living

textures, it is so very gradually, and much of it would have to be employed to produce a decided result. In cases running an acute course it could therefore not be depended on. Indeed, to take Prof. Biermer's case as an example, how much may have been due to the inhalation of the warm fluid alone? That warm water by itself is serviceable we know from Siegle's case, already mentioned.

In *hooping cough*, Dr. Steffen[1] claims to have had success with an inhalation of common salt and opium, and with five grains of tannin and three drops of laudanum in two ounces of water, used daily. But though the inhalations seemed to have afforded some comfort to the children, the duration of three of the cases was from two to three weeks, and one case lasted nine weeks. Hyoscyamus, alum and perchloride of iron have also been employed in this disorder.

Turning now to *pulmonary affections*, we shall inquire into the effects of inhalations on bronchitis, phthisis and hemorrhage from the lungs. In acute *bronchitis*, inhalations of pulverized warm water will often afford much comfort and assist in promoting expectoration. Medicated inhalations I have not used, nor do they seem to have been much resorted to. But in chronic bronchitis it is evident that they have a large field for employ, and the results are sometimes very striking. To cite a case.

Mrs. ——, 48 years of age, consulted me in January for a cough which she had had for upwards of a year and a half. Getting much better during the earlier summer months, she had, in the autumn of last year, after severe and prolonged exposure to wet, a violent bronchitis, or broncho-pneumonia, attended with probably much pulmonary congestion, and shortly followed by a hemorrhage. She stated that her cough was very distressing; the expectoration purulent, profuse, having an unpleasant odor. Moreover it had contained blood daily, for several months, varying in quantity from mere streaks to an amount which gave to the whole sputum in the cup a decidedly bloody appearance. Her breathing was oppressed; at times so much so as to be wheezing and asthmatic. Examining the lungs, they

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[1] Journal für Kinderkrankheiten, Jan. and Feb., 1866.

were found to be filled with rales, dry and moist, the latter far preponderating. There was no decided dullness on percussion, though at the upper part of the right lung an impairment of resonance existed, which may have been due to the partial consolidation of the pulmonary tissue occurring at the time she had the attack of bronchitis or broncho-pneumonia, subsequent to the exposure alluded to. The appetite was good; the general health excellent. As she had tried many remedies faithfully, some under the advice of an eminent physician, I determined to use atomized fluids by inhalation, and directed an ounce of a solution of alum, 15 grains to the ounce, with 6 drops of fluid extract of conium. The first inhalation produced not only no relief, but a decided constriction in the chest; the second, taken the next day, led to a severe paroxsym of difficult breathing. Finding the astringent action of the remedy too great, I reduced its strength to about 8 grains to the ounce. She bore this perfectly well, and already, after the third inhalation, counting in the first two, a change in the sputum was noticeable. It was somewhat less copious, and the quantity of blood in it was obviously diminished. She took altogether, while in Philadelphia—of which she was not a resident—nine inhalations, and when she left the city, though the expectoration was still very copious and as yet but slightly changed in character, it no longer contained a trace of blood.

During her stay here little or no internal treatment was employed; but on leaving, while urging her to continue her inhalations by the atomizer, and to vary them at times by breathing the vapor of tar, I also directed her chest to be painted with croton oil, and gave her a cough mixture, of which wine of tar and fluid extract of wild cherry formed the chief ingredients.

This treatment was carried on for fully two weeks, when I was informed, by letter, that she had used the common inhaler with tar and warm water twice each day, that she had finished her cough mixture, had employed the alum inhalation daily, and that she still had "slight turns of wheezing on lying down, which lasted from half an hour to an hour, but none so bad as that one in Philadelphia, and they are somewhat

relieved by inhaling hot camphorated water. The expectorations are all, or nearly all, from 4 or 5 A. M. to 10 A. M. After that there is but little cough. The expectoration last week was for a day or two offensive, but is very little so now. It is lighter colored, and has not been at all bloody since we returned."

After this, for six weeks daily, she went on steadily with the alum inhalations, increasing the strength to 20 grains or somewhat upwards to the ounce of water. She also resorted occasionally to the ordinary tar inhalations alluded to, and at times to pulverized solutions of common salt. The cough medicine was abandoned and wine of tar taken, though this was not persevered in; the alum inhalations were her main dependence. Under this treatment she gradually recovered: the cough and all expectoration ceased; the asthmatic seizures no longer took place, and when I saw her in Philadelphia, in April, she had been for several weeks perfectly well. She had at that time some rales in her chest, and a very slight expectoration from a catarrhal condition of a few days' standing, but otherwise she presented all the signs of good health. The partial dullness under the right clavicle had all but disappeared.

This case is certainly very interesting as regards the use of inhalations. The unfavorable consequences at first from the too strong solution of alum employed; the speedy disappearance of blood from the sputum; the gradual cessation of the expectoration; the slight general treatment made use of—and to no portion of which does it appear that any decided importance can be attached—are all decided features in the case. And though we may affix some value to the inhalations of chloride of sodium and of tar, yet it is evident that the most efficient remedy was the alum.

Besides this remedy, good results may be obtained from the use of tannin, of sulphate of zinc, of iodine, and, where we wish to promote the expectoration, of muriate of ammonia or of chloride of sodium—to all of which a small quantity of a narcotic solution can be serviceably added. Yet these agents are not always of advantage. The extent of the alteration of the mucous membrane has a great deal to do with the success

of the treatment. I have a gentleman under my care who has had chronic bronchitis, with excessive secretion, for twelve years, scarcely influenced by the various climates which he has sought. In his case inhalations of iodine, of tannin, of carbolic acid, of lobelia, of sulphate of zinc, of alum, of muriate of ammonia, of chloride of sodium, have thus far been used to little if any purpose.

There is no disease for which inhalations are more likely to be eagerly resorted to than *phthisis.* I have employed them and noted their effects with care in quite a large number of cases; but it is impossible here to give more than the general results, and in so doing it will be convenient to separate the effects of the inhalation on the disease itself and on its more prominent symptoms. I will take for analysis 10 cases, treated at the Pennsylvania Hospital, and in which either no other remedies were prescribed, or merely remedies to fulfill a temporary indication. In four cases chlorinated soda was used, the liquor sodæ chlorinatæ of our pharmacopœia. It was employed every day, in doses varying from half a drachm to a drachm to the ounce; or sometimes two inhalations were administered daily, of half a drachm each. In the doses mentioned it was perfectly well borne, and although at first it irritated and had to be given in a more diluted form, after a few days it was taken without difficulty. In the first case—a case in which softening was just beginning—the inhalations were used daily for eighteen days. They caused no difference either in the physical signs or symptoms, though the patient stated that he coughed less and that the expectoration was much easier after them. In the second case the effect on the cough was similar, and the sense of tickling in the throat, for which the patient had previously tried several remedies in vain, was quickly relieved. A decided improvement also took place in her general condition; but the same dullness under the right clavicle with crackling, which existed at the beginning of the treatment, was found after she had for twenty-two days inhaled daily a solution of the strength of one drachm to the ounce. On the whole, however, the remedy appeared to have a beneficial influence. In the third case twenty-five daily inhalations were used. The cough improved. The dis-

ease, which had not advanced to softening, remained stationary. But neither physical signs nor general condition showed any decided amelioration. In the fourth case the chlorinated soda was not used very long and produced no appreciable effect.

The results in these cases were not particularly encouraging, though not totally negative. Two cases were then treated with iodine inhalations; liquor iodinii compositus, viii. minims to ℥j. increased to xv. minims to ℥j., taken daily or twice daily. Both improved—one strikingly. This was a case of tubercular disease of both lungs, following right-sided pleurisy. There was crackling (not, however, coarse) at both apices, and he was losing flesh and strength rapidly, notwithstanding that he was taking cod liver oil and iron. The cough was dry and irritative. He used every day, for a month, iodine inhalations, at first eight minims in each, then fifteen minims morning and evening. The internal treatment was stopped. He gained several pounds of flesh; his appetite became good; the respirations came down to 18, the night-sweats ceased, and an undoubted change took place in the physical signs; the crackling almost disappeared, the dullness lessened. The inhalations at first produced some irritation and a little cough. They were always followed by slight expectoration.

Solution of chloride of iron was used in 2 cases. In the one there was coarse crackling, with distinct blowing and rather low-pitched respiration under the right clavicle, and coarse crackling on the left side; the symptoms were those of phthisis passing into the stage of softening. One-eighth of a grain of perchloride of iron was used morning and evening for sixteen days. It rather reduced the expectoration, but did not influence the progress of the disease. In the second case the effects were decidedly beneficial. When admitted into the hospital there was dullness on percussion, with harsh breathing under the left clavicle; hacking cough of several months' standing; great pallor and marked anæmia, which may, however, in great part, at least, have been due to a severe attack of menorrhagia. The pulse was 108; the respirations 26. The perchloride of iron was administered in the same way as in the preceding case. In a week after she had commenced it, the lips were of far better color, and she began to gain flesh and strength. The

dose was, after seventeen days, increased to one-half a grain daily, which she took for ten days, all the time improving. For a short period a solution of pyrophosphate of iron was substituted, but she went back to the chloride. The iron inhalations were used for about six weeks, and shortly before leaving the hospital her cough had all but disappeared. There was a scarcely appreciable difference in the percussion note between the two sides of the chest, and the respiratory murmur had lost its harshness. She did not feel quite so strong and well as ten days previous, in consequence of an attack of intermittent fever. I have heard that since she left the hospital she has had two hemorrhages.

In the 2 remaining cases out of the 10, chloride of sodium and muriate of ammonia were chiefly employed. They were not without influence on the cough, and on the expectoration; but were apparently no check to the disease.

Thus it will be seen that iodine and iron inhalations both had a decided effect where softening had not as yet occurred. But did they do so in virtue of any local action, or of their general power on the economy after being absorbed by the respiratory mucous membrane? This question is one difficult to solve, save by the most careful observation of a large number of cases. But under any circumstance it would certainly seem that these remedies merit a trial in cases of early pulmonary tuberculosis. Supposing the inhalations to be well borne and rather comforting to the patient, as they mostly are, do we not then introduce desirable medicines into the system without inconvenience, and by carefully making use of the lungs, save the stomach?

In turning to the symptoms of phthisis we find, as regards the cough, especially when occurring in paroxysms, that pulverized solutions of the watery extract of opium, of conium, or of cannibis indica afford relief. In cases of cavities with purulent contents, or under any circumstances to render the sputum more easy of expectoration, solutions of common salts or of muriate of ammonia are of avail. Where the sputa are copious and offensive, tar has been recommended. But judging by the case of a gentleman whose lungs were riddled with cavities, and whose expectoration was purulent, profuse, and

very fetid, tar inhalations pursued in the ordinary manner are better, certainly quite as well, borne, and afford more comfort.

As regards *hemorrhage from the lungs*, the evidence that has been collected in favor of the treatment by atomized liquids appears very decided. A number of cases have been reported by Sales Girons, by Lewin, by Siegle, by Zdekauer and others, in which, instantly after inhalations of strong solutions of alum, or of chloride of iron, the hemorrhage stopped. I have used alum, chloride of iron and persulphate of iron, and have thought that the remedies had so distinct an effect that I should not be willing to abstain from resorting to them in any case of pulmonary hemorrhage at all unyielding. At the same time, as the cases in which the inhalations were employed were on active internal treatment, I do not bring them forward. There is nothing more difficult to establish than the relation between cause and effect in hæmoptysis. The *post hoc propter hoc* is here so uncertain that evidence, to be accepted, ought to be of the most unimpeachable kind. Of my four cases this cannot be said. I will, however, state that, contrary to what may be expected, the inhalations gave rise to no irritation nor coughing or oppression. They may be used very strong. In one of the cases alluded to, our Resident Physician at the Pennsylvania Hospital, Dr. Herbert, employed a saturated solution of alum; in another, a drachm of Monsel's solution of subsulphate of iron to an ounce of water. The cases under discussion were all extremely severe. In mere spitting of blood, or in instances of blood-streaked sputum, the influence of the astringent remedies are often very obvious. The case of the lady above reported, affected with bronchitis, is a case in point. I have seen one quite as striking, in which two inhalations of a solution of subsulphate of iron arrested a bloody expectoration which had lasted for four months.

Summing up, now, the results of this inquiry, it may be stated to lead to these conclusions:

That inhalations by means of atomized fluids are an unquestionable addition to our therapeutic means; but that they are nothing but an addition, and not a substitute for all other treatment.

That in most acute diseases of the larynx, and still more so in acute disorders of the lungs, their value, save in so far as those of water may tend to relieve the sense of distress, etc., and aid expectoration, is very doubtful; though in some acute affections, such as in œdema of the glottis and in croup, medicated inhalations have strong claims to consideration.

That in certain chronic morbid states of the larynx, particularly those of a catarrhal kind, and in chronic bronchitis, they have proved themselves of great value.

That in the earlier stages of phthisis, too, they may be of decided advantage, and that at any stage they may be a valuable aid in treating the symptoms of this malady.

That their influence on such affections as hooping cough and asthma is not satisfactorily proven.

That they furnish a decided and unexpected augmentation of our resources in the treatment of pulmonary hemorrhage.

That they require care in their employ; and that in acute affections we should consider whether, as they have to be used frequently to be of service, the patient's strength justifies the disturbance or the annoyance their frequent use may be.

That the question in any disease of the respiratory tract is not whether the atomized fluids can reach the seat of the malady, but whether they can do so in sufficient quantity, and in a manner to become available as a therapeutic means.

That in estimating the action of inhalations of atomized fluids, we must accord due value to the ready absorption of many through the pulmonary structures, and guard against attributing to a local influence what may be due to the constitutional effect of the remedy.

That in any case, to be of service, they ought to be carried on as a treatment with a distinct object, and not intermittingly or spasmodically resorted to.

These conclusions and the remarks preceding them apply exclusively to the treatment of the diseases of the respiratory passages by atomized fluids, for though incidentally the inhalation of gases or vapors has been mentioned, it has purposely been no more than alluded to, since this subject has been long before the profession and has been often examined; whereas that of inhalations by means of atomized fluids is a novel one,

and one which will require much unbiased investigation to determine its true position.

And, in conclusion, I will point out what a wide range of applicability atomization has beyond that to the treatment of the diseases of respiration. By atomizing salt or iodine in rooms or in wards of hospitals, we can cause our patients to breathe constantly an atmosphere impregnated with these agents, if such an atmosphere be thought desirable. Permanganate of potassa or chlorine may be used in the same manner as a disinfectant; and, as I have tested now in many cases, we may obtain by atomization the constitutional effects of remedies on the system. In cases in which the stomach cannot be resorted to this will be a great aid. It is scarcely necessary to dwell on its value, for instance, in anæmia, with enfeebled digestive powers. The effect of remedies, too, thus administered, is generally very prompt. I have seen the pupils dilate and a staggering gait produced by breathing for a few minutes a pulverized solution of conium. Of course it is incumbent upon us not to avail ourselves of the respiratory mucous membrane needlessly; and if it be employed, it ought to be done so with care, for it is not a membrane that will bear the slights and rude usage the stomach receives. But it is a great satisfaction to know that should we wish to make use of the lungs to introduce medicines into the system, that we possess now a means more certain, more efficient and more susceptible of being regulated than any that were formerly available.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A Treatise on the Principles and Practice of Medicine; designed for the use of Practitioners and Students of Medicine. By Austin Flint, M.D., Professor of the Principles and Practice of Medicine in the Bellevue Hospital Medical College, and in the Long Island College Hospital; Fellow of the New York Academy of Medicine, etc. Philadelphia: Henry C. Lea. 1866. 8vo, pp. 867.

We know of no physician of more proper capacity for writing a treatise on the Practice of Medicine than Dr. Flint. His opportuni-

ties for the study of disease have been large and varied, during more than a quarter of a century, in the Northern, Western, and Southern States, and he has fully availed himself of them, by sedulously cultivating clinical medicine, as his numerous and valuable contributions to medical literature testify. He has kept abreast with the progress of the science and the art of physic, by a knowledge of the labors of those who have worked for their advance, which is intelligently shown in this book, where no attempt at encyclopædian lore is made, and decrepit doctrines and ill considered novelties alike find no place. "Discussions relating to mooted pathological questions are rarely entered into. . . . As regards scope, the work embraces the subjects which generally enter into didactic teaching from the Chair of the Principles and Practice of Medicine in the medical colleges of this country. . . . Finally, in writing the volume, the study has been to keep prominently in mind the practical applications of medical knowledge to diagnosis, prophylaxis, and therapeutical indications." (Preface.) We cannot express our opinion of Dr. Flint's "Treatise" more decidedly than by saying that he has very successfully carried out his purpose, and written an excellent and trustworthy Practice of Medicine. It is no pretentious summary of the views of every writer, great and small, who may have treated of a given subject, linked by an occasional conjunction—an amorphous mass, to bewilder the student and young physician, and at best useful as a bibliography. The author is no more dazed by authority—running his wheels in old ruts—than seduced by the crudities of the freshman craving for notoriety—losing his way by the glimmer of false lights; he thinks out his matter, treats it with the aid of his own judgment and practical experience, and the result is a book that "fairly represents the existing state of the science of medicine, and reflects the views of those who exemplify, in their practice, the present stage of the progress of medical art." The first edition of so comprehensive a work as this one, in which the author shows such fitness for his mighty task, so much diligence and honest purpose, and who, in the main, teaches such sound doctrines, should not be made the object of technical criticism, but should be judged by its real merits, rather than by dwelling on occasional shortcomings, or parading the differences of of opinion between the author and the reviewer, though

"His faith, perhaps, in some nice tenets, might be wrong."

The style is sufficiently clear, if not graphic; and, though its necessary conciseness may not make it very attractive, it is marked by singular

directness. Few medical writers have the great descriptive gifts of John Bell or Sir Thomas Watson. Dr. Flint wastes no words, flies no phrases, but always succeeds in making his meaning understood.

Our author is no believer in "the opinion held by some that diseases and the human constitution have undergone a change during the last quarter of a century, and that blood-letting and other anti-phlogistic measures are less appropriate now than formerly. This opinion seems to me not well founded. After a professional experience extending beyond the period just named, I do not hesitate to express a conviction that acute inflammations at the present day are essentially the same as they were twenty-five years ago, and that anti-phlogistic measures were no more appropriate then than now" (p. 131). Our own experience, extending over the same period, is to the like effect. We found spoliative treatment in 1840 as harmful as it is generally believed to be in 1866. Much the same language is held by Dr. Markham, in his Gulstonian Lectures for 1864, and lately republished in a separate form. He combats the theory of *change in type* as emphatically erroneous, and shows that the revolution which has taken place in the treatment, particularly of inflammatory diseases, is not because the effects of blood-letting are different now from what they were formerly, but that we changed our practice long before the type theory was started, on account of advances in pathology, diagnosis, clinical observations, and therapeutics, which have given us a better insight into the nature of disease. He shows, too, venesection was not the unfailingly successful remedy we suppose it to have been, and its universal practice in by-gone times as blamable as its total disuse at the present day.[1] It can have no directly beneficial influence over inflammations; its good lies in removing incidental obstructions, and it can be of service only when the action of the heart and lungs is hindered under certain circumstances, and then should be used wisely. In the preface to the work is a letter from Sir Thomas Watson, who acknowledges the result of his late reading and inquiries and careful reflection on the matter is, that his belief in the soundness of the doctrine of a general and more abiding variation of type, has been shaken, and that our practice has been modified on grounds of reason,

[1] The famous Guy de la Brosse, the founder of the Jardin des Plantes, refused in his last illness to be bled. He styled bleeding the remedy of sanguinary pedants, and said that he would rather die than submit to the operation; "and he did die," says Basilis, a brother doctor of the time, "and the devil will bleed him in the next world, as such a rascal and unbeliever deserves."

and as the result of progress. And in this connection we cannot help quoting the excellent remarks of Dr. J. Russell Reynolds, in the introduction to his "System of Medicine;" he says: "Partly to account for, and partly to justify so material a change in our modes of dealing with disease, it has been assumed that the vis vitæ of the British constitution has been lessened, or that the so called 'type' of its maladies has altered; an assumption that has little to be said in its defense, and still less than can be regarded as its establishment. A more simple, and, we believe, accurate explanation of the change is to be found in this, that previously theory was the groundwork of therapeutics, and that now fact is the basis of treatment; that years ago diseases were treated by their names, and that now they are treated by their known conditions; that local changes were the main guides in times gone by, but that the general state of the patient is that which in these days the physician esteems as his therapeutic informant. When pathology scarcely existed, medical practice was an empirical art, and had, with the few advantages of that position all its evils; whereas with the growth of pathology, therapeutics, still an art, has become, or is becoming a science; and knowing more accurately the limits of its powers, is content to attempt less heroic measures, being convinced that it does less harm. Much is done by medical treatment now, more real good than was ever done before, but it is done in a different way, and with another aim; disease is detected in its earlier stages, and often arrested there, and when developed the patient is guided through it, if he can be, and is not sacrificed at some wild attempt at its destruction" (p. 23).

The general tendency of Dr. Flint's therapeutic notions may be guessed at from his paper on "Conservative Medicine as Applied to Therapeutics," published in the *American Journal of the Medical Sciences*, January, 1863. He is no advocate of perturbating and depressing measures. "Conservative medicine," he says, "does not interdict the use of the most potential remedial agencies; but it enforces discrimination and circumspection in their use, recognizing fully their potency for evil as well as for good. The conservative physician is by no means a mere spectator of the progress of disease, but, in wielding the resources of therapeutics, he is careful to preserve the powers of life—following the injunction of Chomel, not so much to treat disease as patients affected with disease" (p. 107). Dr. Samuel Wilks, the eminent pathologist of Guy's Hospital, London, and the lecturer on the practice of medicine in the school of that institution, in a lecture recently published, most justly observes, on this subject:

"We have diseases, such as fever and the exanthemata, for which we know no remedy, but simply watch the progress of the case; the aid of the medical man, however, being equally beneficial. There are still other affections for which we have no specifics to produce a direct cure, nor are we utterly helpless in assisting the patient. We adopt measures, based on a true scientific method, by which we lead the sufferer to health. Such cases and their mode of treatment place our profession on a sure basis, and constitute the best examples antidotal to all quackery. The patient has recovered under the judicious treatment of the doctor, but the medicines were only indirectly curative. If you believe that they are curative, you are not raising your position, but lowering it. You are giving credit to the medicines which you should give to yourself. It is your skill to which the patient owes his life, and not to some specific medicine. . . . Do not think that I have no faith in medicines, and wish to implant a similar skepticism in your minds. I believe as much in the efficacy of many drugs as does any member of the profession. I wish merely to impress on you the necessity of regarding them in their true light, as a means to assist us in the treatment of disease, and not in the quackish sense of remedies, which savors of mysticism."

In indorsing the conservative therapeutic views of our author and others of the same school, we intend to profess no doubting of our art; on the contrary, we hold, with Dr. Reynolds, that at no period of its history has it so well deserved the confidence of the public as at this time, because never before has it been so rationally and knowingly practiced. Expectancy in therapeutics, as generally understood, is either a fraud on the patient or a refuge for incompetency, and the so-called *vis medicatrix naturæ* an empty phrase, signifying nothing, or, what is worse, a snare and a delusion. We utterly deny the intelligent action of nature in its struggle with disease; it shows simply blind instinct, which has no method or measure. Take the common instances of a fracture of the thigh, or both bones of the forearm, or even a mote on the conjunctiva, and mark the results of the unaided efforts of nature. In the one case, at the time plastic matter is poured out the muscles are at work producing displacements, which are sure, if uncontrolled, to cause disabling deformity; in the other, how often does the increased lachrymal secretion wash away the offending particle? and look at the amount of irritation and its consequences which are at once set up in this act of nature. In both cases the surgeon's intelligent interference puts aright the irregular and faulty struggles of nature, by overcoming muscular contraction and adjusting the ends

of the fractured bones in the first, and by dislodging the foreign body in the second, all troubles stopping at once. With the paludal fevers, cholera morbus, and the irritant poisons, her so-called conservative efforts are blundering and perilous; here art steps in and is truly saving. Those who think, with the amiable author of the Religio Medici, that "nature is the art of God," and hold that

"—— art may err, but nature cannot miss,"

do not believe in the art they profess to practice and live by, and must of necessity be often passive abettors of mischief, when faith and skill would make them active agents of good. Nature too frequently forgets her cunning, shows not seldom a wild impatience, is too prodigal in her waste, and her ways are too willful to be left to fight disease by her own lights; she will be found as blind a guide in therapeutics, and to require as close a watch over, and as active meddling with, her unintelligent efforts by art as her physical promptings need the help of morality and prudence. Our improved system of therapeutics is based on a better knowledge of the laws and relations of morbid changes; if we do less harm than our forefathers, and, as we believe, do more positive good, it is, as Dr. Reynolds justly remarks in the chapter we have already quoted from, because "we see that the man is greater than his maladies; that his general condition is of more importance than his local ailments; that disease is a change in him rather than in some part of him; and that no treatment can be of any real service which sacrifices the greater to the lesser." We are reminded of these golden words, written by Dr. Latham, years ago: "There is a lesson which we are apt to learn slowly, but all of us learn at last—it is this, that while present pain and present peril call loudly for relief and rescue, still, in relieving and rescuing, the ultimate well-being of the patient must not be disregarded altogether." This is the key to rational therapeutics—the true appreciation of the general pathological condition, and a disregard of theories of local genesis. The powers of life must be maintained, and our efforts should be directed to keep whole or restore the functions of the great vital centres.

If we understand aright Dr. Flint's "Conservative Medicine as Applied to Therapeutics" to mean "Restorative Medicine," we most heartily indorse it, and trust that he may long live to teach it. Founded, then, on reason and a right understanding of disease, we may look for our author's therapeutic notions to be no more favorable to the indiscriminate use of mercury than to that of blood-letting, and such is the case. In the very first disorder treated of he states distinctly that, as a sorbefacient, he has long ceased to employ it for this

end; that its efficacy is doubtful and its evils many (p. 134); there is no mention of it in the treatment of pneumonia; and at page 465 we find: "Mercury has been supposed to be specially adapted to the treatment of all hepatic diseases. There are no reasons, however, for its application to this [these] more than to other acute inflammations." It required no small degree of courage to write thus of the fetich of so large a part of American physicians. Bold words, which must bring a howl from the worshipers of the idol.

In the admirable little volume already referred to, Dr. Markham asks: "Is the disuse of mercury a sign of change of type?" For certainly into disuse is it getting wherever rational medicine has made headway. Even the East Indian practitioners are giving it up as the result of experience. Dr. W. C. Maclean, Deputy-Inspector-General of the British Army and the Professor of Clinical Medicine in the Army Medical School at Netley, who resided for a number of years in India, testifies, in his valuable articles on "Malarial Fevers" and "Dysentery," in Reynolds' "System of Medicine," most strongly against the "calomel practice" in both these disorders. He says: "When I first went to India, calomel was used to an extent that, to practitioners of the present day, is hardly credible. A practitioner of this school in India, in the present day, would be an object of terror to all educated men within reach of his prescriptions. Beyond measure miserable is the spectacle of a man whose system, already saturated with malaria, is still further depraved by the mercurial cachexy. . . . The return to a more rational treatment, based on a sounder pathology, has been attended with a signal diminution in the mortality from all forms of malarial fevers" (p. 80). "Happily for us," says the traveler Burton, speaking of paludal fever, "the old African treatment is now obsolete. A. B. caught fever; gave him calomel, bled him, blistered him; died on the third day." Has not the system of the dark days of African and Indian practice found a refuge elsewhere? Is not mercury, after all, the staple drug of a very large class of practitioners in this country? Is it not all but universally prescribed, no matter what the disease? And is not a false, and what ought to be an obsolete, pathology at the bottom of the evil? Inflammation is to be subdued, the liver unloaded, the secretions made active—and all by the all-powerful dose of blue pill or calomel. The venerable consulting surgeon of St. Bartholomew's Hospital, London, in a recent "Lecture on Some Medical Subjects," deals the "stomach and liver doctors" several hard blows. Speaking of the ordinary treatment of the early stage of a mammary abscess—"leeches, fomentations, calomel, salines,

etc."—he remarks: "Let us begin with the calomel. What object have you in view? To regulate the secretions. What secretions? The liver. What has the secretion of the liver to do with an abscess of the breast? Do you necessarily infer disordered liver because the mammary gland is the seat of abscess? Can any opinion be more irrational? I often marvel at the wonderful faith exhibited by medical men in the influence of these 'secretions,' as though the liver, the most inoffensive organ in the whole body, was the centre and focus of all its maladies. Well: the calomel and the other depressing agents do their work, and what are the consequences? The patient is weaker; whatever nourishment remains in the body is taken from it. The supply of food is arrested. Salines follow, and draw on the circulation yet more positively, and there remains the tumor as at first." "Rather," he adds, "let us endeavor to restore the constitution to that condition of health and vigor it possessed before the crisis occurred which led to all this mischief, and depend upon it you will find your tumor gradually disappear, or it will pass quickly through those changes essential to recovery, whether by gradual absorption, or by rapidly formed but limited suppuration, the one or the other alternative depending on the early or late resort to rational treatment." How often does the patient succumb to the severity of the treatment rather than to the malignity of the disease? Intelligent persons will no longer submit to measures which they believe to be dangerous and know to be unnecessary, and those who continue to practice them not only do an injury to their patients, but to their art, and directly help quackery.

After an Introductory Chapter on Definitions, Nomenclature, Symtomatology, Diagnosis, etc., Dr. Flint has divided his work into two parts; the first treating of "Principles of Medicine, or General Pathology," and the second "Practice of Medicine, or Special Pathology." The chapters on General Pathology are necessarily sketchy, occupying only eighty-six pages. We doubt very much the utility of the introduction of this subject in a Practice of Medicine; it can be but very imperfectly handled, and has a tendency to make students slight the very foundation of their art. As well might a summary of human anatomy preface a treatise on the Practice of Surgery. We hope in another edition to see Dr. Flint expand this portion of his book into a separate volume. The classification adopted of "individual diseases" is the convenient one of dividing them into *local* and *general*. Local diseases are arranged according to the system affected —as the Respiratory, Circulatory, Digestive, Nervous, and so following. Section sixth is devoted to "Fevers and other General Dis-

eases." Oddly enough, while diphtheria finds a place, and very properly so, under the head of "General Diseases," Asiatic Cholera is put amongst the local, and in the same chapter with Sporadic Cholera (cholera morbus), with which it has as little pathogenetic affinity as with congestive malarial fever; and the author acknowledges, too, that "a special cause is undoubtedly essential to the production of epidemic cholera; ordinary causes of disease alone are incapable of producing it" (p. 424). Pneumonia is styled pneumonitis, a doubtful term, at least to those who look forward to see at no distant day some of the disorders included in the general title of pneumonia transferred to the domain of general diseases. Surely there must be some oversight in the following sentence, taken from the treatment of Capillary Bronchitis: "Blood-letting may be employed at the onset, under the conditions by which the employment of this remedy in other inflammatory affections is to be regulated" (p. 184). If a happy issue is to be had in this disorder it is by a supporting treatment from the beginning, all spoliative measures diminishing the chances. He speaks of it as "occasionally met with in adults." This hardly represents its degree of frequency in adult life; it was by no means a rare disorder in our army during the rebellion, and was at times very fatal amongst the colored troops. It is singular, too, in a work bearing the imprint of 1866, to find the laryngoscope thus cavalierly disposed of: "The recent introduction of the laryngoscope is likely to prove serviceable in the diagnosis and treatment of laryngeal affections" (p. 224). Of morbid growths in the larynx we are told nothing. In the treatment of dysentery we find no mention of ipecacuanha in large doses, the system of treating acute dysentery now almost invariably followed in British India, and of which Dr. Maclean says, after twenty-two years' experience with it, and, from our own limited experience, we think very justly, that "It is the most simple, the most successful, the most conservative, and the least distressing mode of treatment I have ever seen used in dysentery. Year by year under its use the number of chronic cases is becoming smaller, and hepatic abscess as a complication is less frequently seen. Although most effective in the earlier stage of the acute form, it may be given at a much later period with advantage, and even in chronic cases; where from any cause sub-acute symptoms have set in, I have often given it with the best results." (Reynold's *System of Medicine*, vol. i., p. 124.) It has been long enough in use on a large scale to test its value by figures, and these speak strongly in its favor. It has, in the British Army, almost entirely superseded the old plan of general

and local bleeding, with mercurialization, either by calomel in scruple doses, or in smaller quantities at short intervals in combination with opium. Dr. Maclean has very properly said, respecting the treatment of dysentery in soldiers, that "experience has shown that men cured by mercurial treatment are as a rule cachectic, exsanguine, prematurely old looking, extremely sensitive to atmospheric changes, and to relapses from trivial causes;" and Morehead has remarked, that "men actually under the influence of mercury are very predisposed to the disease." Under the head of Inanition we have some excellent remarks upon the effects of insufficient nourishment in the course of both acute and chronic diseases, but the acute delirium which so frequently results, and has been well described by Webber and Becquet, is not spoken of. In Progressive Locomotor Ataxy Dr. Flint has chiefly followed Trousseau, and has not availed himself of the valuable collection of cases of this disorder by Topinard; nor is the exhaustive treatise of Bricquet recognized in the chapter on Hysteria, a very excellent one, by the way. Glosso-laryngeal Paralysis is passed over without a word. The valuable researches of Mr. Lockhart Clarke in tetanus are ignored, as well as those of Dr. Pavy in diabetes. The meaningless term Apoplexy is retained, and "in conformity to long usage," certain phenomena, the sign-language of "different pathological conditions," are treated of as a distinct disease, though it is admitted that "they constitute different affections, and it would be better to consider the apoplectiform phenomena as belonging to the clinical history of these affections" (p. 509).

The chapters on Fevers are among the very best in the book; sound in pathogeny and treatment. In speaking of Relapsing Fever, Dr. Flint says: "So far as I know, the only cases observed [in the United States] are a few reported by Dr. A. Dubois, in 1848, and fifteen cases which came under my observation in 1850–51" (p. 731). The first cases of Relapsing Fever observed in this country, and recognized as such, were by Dr. Meredith Clymer, in the Philadelphia Hospital, in 1844, and described by him in 1846, in his work on "Fevers: their Diagnosis, Pathology and Treatment" (p. 99). The concluding chapters treat of diphtheria, gout, rheumatism and scurvy, and these different subjects are ably handled.

Not the least valuable feature of the work is the introduction of the result of the author's own observations in many diseases, as well as his careful analysis of a large number of cases of a given disorder, with reference to its symptoms, results of treatment, etc. Dr. Flint has occasionally spoken authoritatively—not dogmatically, as has been

erroneously asserted—and very properly so; and we only regret that he has not more often, and with a bolder hand, brushed away old time fallacies. The failure to do so is to be attributed to his modesty and caution, rather than to any lingering reverence for authority in the face of facts and reason.

A work which must become so generally popular and widely circulated is worthy of better paper, larger and clearer type, and altogether a more attractive guise than the publisher has given it.

On the Diseases, Injuries, and Malformations of the Rectum and Anus; with Remarks on Habitual Constipation. By T. J. Ashton, formerly Surgeon to the Blenheim Dispensary, Fellow of the Royal Medico-Chirurgical Society, etc. With Illustrations. Second American, from the Fourth and Revised English Edition. Philadelphia: Henry C. Lea. 1865. 8vo, pp. 287.

Mr. Ashton's book has been before the profession for several years, and its value, as a compact and practical monograph on rectal and anal disorders, recognized by the number of editions called for, the present one being the fourth.

The chapter on "Hæmorrhoidal Affections" is full and very sensibly written, and, on the whole, teaches sound and safe practice. Cold water enemeta, as a palliative means, barely receive their due. Our own experience leads us to set much value on their use, particularly in those cases where there is hypertrophy of the submucous tissue, with considerable development of the smaller blood vessels, and much vascular action. Properly employed and persevered in, they give infinite comfort to the patient, and, occasionally, obviate a resort to radical measures. No mention is made of the India-rubber or metal plug, much praised by some of the English surgeons. Mr. Ashton considers excision applicable only to external hemorrhoids, "while the ligature, and, in some cases, the use of nitric acid, are preferable in the removal of internal hemorrhoids" (p. 105). "That crushing, lacerating, and unscientific machine, the écraseur," very properly receives utter condemnation. Its use is strongly deprecated by Mr. Curling, in his excellent work on the "Diseases of the Rectum." Mr. Nelaton has shown the risk of subsequent traumatic stricture of the rectum from this instrument, and we have known serious hemorrhage to follow its use. Oddly enough, no mention is made of Mr. Salmon's operation, by which, from the separation by the knife or scissors of the hemorrhoidal tumor from the subjacent parts, for about the lower

three-fourths of its extent, the smallest possible amount of tissue is included in the ligature, and that at a distance from the anus where the mucous membrane is so sensitive. The advantages of excision, which are undeniably great, are thus secured without its single drawback—hemorrhage—which is the reason of its almost complete abandonment at the present day; and the pain, tediousness, prolonged ulceration, and risk of tetanus, when the ligature is employed, done away with.

Mr. Ashton limits the employment of nitric acid to "the vascular excrescence of the mucous membrane" form of internal hemorrhoids, though even in these cases he says it "does not always succeed." First suggested as a remedy for hemorrhoids by the late Mr. Cusack, of Dublin, and highly extolled by Dr. Houston, nitric acid had, until recently, very strong advocates among the London surgeons. It is now, however, by some of its former supporters pronounced unsafe, and another Dublin practice—the clamp and cautery—has recently received the unequivocal indorsement of such men as Mr. Henry Lee and Mr. Henry Smith as the quickest, surest, safest, and least painful of all the operations for hemorrhoids. Mr. Smith, in his Lettsomian Lectures, 1865, thus describes the plan: The hemorrhoidal tumor is firmly compressed at its base between the blades of the clamp—a sort of blunt scissors, with a screw—which prevents their slipping away; they are then shaved off, and the actual cautery is passed over the cut surface; the clamp is gradually relaxed, and if there is any bleeding vessel, it is tightened and seared and the parts are returned. It is essentially Dupuytren's method, with the addition of the clamp, which instrument, however, Mr. Smith claims holds the pile so securely that it cannot slip away before it is thoroughly cauterized, thus obviating the risk of bleeding after the parts have been returned within the anus, and meeting the objection to the French surgeon's practice, on account of the after-hemorrhage, which was so likely to happen. Mr. Smith asserts, too, on behalf of his, that it lessens the risk of long continued subsequent ulceration, and that neither tetanus nor pyæmia can occur. After the clamp and nitric acid operation we know that bleeding may and does take place; and, after the separation of the slough from the cautery, we can see nothing in the condition of the parts which secures absolute immunity from the risk of this accident, or, indeed, from pyæmia. More facts, we think, are wanted, before this practice shall receive the formal and full sanction of the profession.

The chapter on Ulceration of the Rectum is inferior to that of Mr. Curling, and Mr. Ashton regards venereal ulceration, we infer from

his remarks, as nearly always a primary affection, the result of "the direct application of the poison from the genitals," no mention being made of so-called tertiary syphilitic ulcer of the rectum, not accompanied by mucous patches about the anus, attended with dysenteric symptoms, and followed by contraction of the gut. Dr. Wilks has also noticed those instances of syphilitic ulceration of the rectum, where the disease has extended inwards from the external parts, particularly in women, where the genital organs have been extensively implicated. In fissure of the anus our author's experience justifies him "in stating that in the majority of recent cases it is not necessary to have recourse to an operation." Amongst "the simple means" recommended for the cure of this affection—the cause of so much local distress, and which we have found most generally rebellious to all such topical means—Mr. Ashton omits Dr. Trousseau's rhatany treatment, which that physician claims has been so successful in his hands, and therefore merits notice in a work like this. When the simple means fail, Mr. Ashton advises a modification of Boyer's operation—incision through the ulcer; but adds, "it need not be carried through the sphincter, as he advised." Although supported by the authority of Mr. Copeland, Sir Benjamin Brodie, and Mr. Syme in this recommendation, we cannot help believing that the only radical treatment is to hinder for a while the contraction of the sphincter, which can only be effected by its complete division, or by forcible and sudden dilatation, as first recommended by Dr. Recamier, lately revived by M. Aran, and successfully employed in this country by Dr. J. Harris, of Savannah. Mr. Ashton appears not to have heard of Recamier's operation, for he makes no allusion to it. Neither is mention made of that affection consisting in an enlargement, tissue change, and sometimes ulceration of the sacs or pouches just within the anus, first described by the late Dr. Physick. This affection is not rare, and but too seldom recognized, and gives rise to great discomfort, and often acute pain. We have quite recently met with a case of chronic diarrhœa, with sudden and uncontrollable defecation, which had gone the rounds of both orthodox and heterodox treatment, without relief, which was alone due to and maintained by a sacculated rectum.

The Elements of Prognosis in Consumption, with Indications for the Prevention and Treatment. By JAMES EDWARD POLLOCK, M.D., Fellow of the Royal College of Physicians, etc., etc. London: Longmans, Green & Co. 1865. 8vo, pp. 432.

The title of this work hardly conveys an adequate idea of its scope.

The work is, in fact, a pretty comprehensive treatise on pulmonary consumption. We have no right to find fault with the author for using the name consumption in the title of the work, but it is to be desired that this name should go out of use. Aside from the inappropriateness of limiting it to only one of the many diseases which lead to a notable degree of emaciation, the popular notion that it seals the doom of the patient renders it objectionable, now that, with an advanced knowledge of the disease and improved principles of management, recovery is by no means of very infrequent occurrence.

Premising some excellent considerations relating to organic disease in general and the resistance of the system, the author treats, in the first part of the work, of phthisis as a constitutional affection, and of its duration.

This part of the work offers us an occasion, of which we gladly avail ourselves, to protest against a late custom with some writers of introducing diagrams with curved lines to indicate to the eye statistical facts. Plain statements in words or figures are more quickly and clearly comprehended. Why, therefore, resort to an intricate and obscure plan, which costs the author much labor to devise, and the reader not a little trouble to understand? The various circumstances affecting the duration of the disease are well considered in the chapter devoted to this topic.

A chapter is devoted to the premonitory stage of ordinary phthisis. It seems to us that the author fails to make out with distinctness the symptomatic manifestations of such a stage. In a pathological point of view this stage doubtless exists, but in a large majority of cases it is latent, and in the cases in which the deposit of tubercle is preceded by ill health, the ailments are not of a kind to point distinctly to the impending tuberculosis. Certain it is that most cases of tuberculous disease do not come under the cognizance of the physician until after the deposit has taken place. The importance, however, of heeding any deviation from health, if there be ground to suspect an hereditary or congenital predisposition, cannot be too much impressed.

The different stages of phthisis, with reference to the elements of prognosis and the importance belonging to age, various associated affections, pregnancy, lactation, perineal fistula, hereditary influence, etc., are fully and ably considered in connection with the analysis of a large collection of cases, observed, for the most part, at the Brompton Hospital. The results of the analysis are of great value, and will make the volume extremely useful for reference.

The latter part of the work is devoted to the prevention and treat-

ment of pulmonary tuberculosis. The measures advised, in the main, seem to us eminently judicious, and are in accordance with the practical views generally held at the present time by the best practitioners of this country. Were we to write a critical review of the work, however, we should take exceptions to the use of blisters, croton oil, tartar emetic, setons and issues, which, as counter-irritants, the author, in our judgment, carries, to say the least, too far. We are disposed to doubt whether active measures of counter-irritation are ever of use in the treatment of this disease, and their use, to the extent recommended by the author of this work, has now few if any advocates among American physicians.

A practical precept which the author enforces is, that exclusive reliance should not be placed on physical signs in determining the actual condition of patients with reference to prognosis and treatment. We are far from taking issue with him on this score. In addition to the precise information which auscultation and percussion afford, the vital phenomena and various circumstances relating to age, predisposition, etc., are to be taken into account. That there are those who limit their attention too much to physical signs is undoubtedly true; but, on the other hand, there are many more who do not qualify themselves to obtain the very important information to be obtained by means of physical exploration.

If we were to make a criticism here, it would be that the author does not enforce quite enough the value of physical signs, and that he speaks of the purely stethoscopic physicians in a way which has somewhat the appearance of undervaluing auscultation. In making this criticism we would add that we are quite sure the author has no intention of depreciating physical diagnosis.

In this brief notice we have adverted to a few points in a critical spirit, without referring to those which seem to us to have special interest and value. The latter predominate greatly over the former. The work contains much that is both interesting and valuable, and, as such, we heartily commend it.

On Spermatorrhœa; its Causes, Symptomatology, Pathology, Diagnosis, Prognosis, and Treatment. By ROBERT S. BARTHOLOW, M.D., Professor of Physics and Medical Chemistry in the Medical College of Ohio, etc. New York: William Wood & Co. 1866. 8vo, pp. 112.

Lallemand's erroneous teachings on the Pathology and Treatment of Spermatorrhœa have been, for more than twenty years, the guide

of the majority of practitioners, and we are glad, at length, to see the subject ably and judiciously discussed in a special treatise, and the more correct views of modern investigators fully set forth. Viewed in this respect alone, the little work before us will accomplish a good purpose; but, again, it will be productive of a double good, for an enlightened comprehension of the subject will lessen that aversion which too many practitioners entertain toward a subject at once disagreeable in itself, and to a certain extent disreputable, and thus many an unfortunate and truly pitiable subject of this distressing malady will be rescued from the hands of the ignorant and pretending charlatans, to whose mercenary offers he is not unfrequently driven in desperation to resort by the indifference of the regular practitioner. The book supplies a want that has long been felt by the profession, and can be confidently recommended as a reliable guide to both student and practitioner, and as embracing the most recent and well sustained advances that have been made, both in the pathology and therapeutics of the malady in question.

Medical Diagnosis, with Special Reference to Practical Medicine. A Guide to the Knowledge and Discrimination of Diseases. By J. M. Da Costa, M.D., Lecturer on Clinical Medicine, and Physician to the Pennsylvania Hospital, etc., etc. 2d edition, revised. Philadelphia: J. B. Lippincott & Co. 1866. 8vo, pp. 784.

The appearance of a second edition of Dr. Da Costa's book within so short a time after the publication of the first, is convincing proof not only of the value of the work, but also of the need that was felt for a truly reliable treatise on medical diagnosis. As the book has already been reviewed in our columns, we shall not now enter into any lengthy notice of it. Dr. Da Costa has availed himself of some valuable suggestions, made by his former reviewers, and has entirely revised the volume, adding about ninety pages of new matter, chiefly on subjects that were very briefly touched upon in the former edition. Perfection, of course, cannot be claimed for any work; but as it now stands, the work constitutes, in our estimation, the best existing manual on medical diagnosis, and as such we cheerfully recommend it to the student and practitioner. We cannot forbear an allusion to the superb mechanical execution of the volume, which is not only an ornament to the American press, but reflects credit on the taste of the publishers, and is in striking contrast to the indifferent and flimsy style in which so many of our medical works are issued.

REPORTS ON THE PROGRESS OF MEDICINE.

[The *Boston Medical and Surgical Journal* publishes in its issue of August 9th, 1866, the very valuable Report of the Cholera Conference at Constantinople, which we transfer below to our columns, cheerfully acknowledging our indebtedness for the same.]

REPORT OF THE CHOLERÀ CONFERENCE AT CONSTANTINOPLE.

Through the kindness of Dr. William E. Townsend, of this city (Boston), we have been allowed the opportunity of examining the printed report of the Cholera Commission, which held its sessions in Constantinople during the early months of the present year. The document is, in our estimation, one of the most important on the subject of cholera which has ever been issued. It gives the results of the mature deliberations of the Conference, which was in session nearly two months. Recognizing the vast significance of the questions before them, and the importance of thorough and deliberate action, the whole Commission was subdivided into six sub-committees, to which these questions were distributed for consideration. The report before us is the result of the joint labors of these sub-committees, brought together in a common report. It is a large pamphlet of eighty-three pages, and the various subjects discussed are distributed in thirty-three sections. Each of these sections is prefaced by a question, which is followed by a condensed *résumé* of all the most important facts in the history of cholera, bearing upon the point, with the arguments on both sides of the question. The whole is summed up, in each instance, with the conclusion of the Commission, printed emphatically in italics. The vote on each question is also given. We have the impression that this pamphlet was printed for private circulation only, as we have seen no mention of it in the journals, although the recommendation of the Conference with regard to quarantine has been published. The copy before us came through the hands of an influential friend in Paris, direct from the Secretary of the Conference, Dr. Fauvel. Under these circumstances we feel that we cannot offer our readers this week any thing so valuable as an abstract of this report. We have translated the questions at the head of each section, with the answer of the Commission in each instance, and the vote upon it. The whole pamphlet is eminently interesting and valuable, and worth translating. The names of the members of the Commission are as follows: The Count de Lallemand, the Count de Noidans and Segovia, *diplomats*, and Drs. Bartoletti, Bykow, Bosi, Dickson, Fauvel, Goodeve, Gomez, Baron Hübsch, Lenz, Maccas, Millingen, Monlau, Mühlig, Pélikan, Polak, Salem, Salvatori, Sawas, Sotto, I. Spadaro, and Van Geuns.

First Group of Questions—the Origin and Genesis of Cholera; the Endemic and Epidemic prevalence of this Disease in India.

I.—*Whence did the Cholera, called Asiatic, originally come? And in what countries does it exist in our day in an endemic form?*

The Commission, with one voice, is able to answer without hesitation that the Asiatic cholera, which at different times has run over the whole world, has its origin in India, where it had its birth, and where it exists permanently as an endemic.

Adopted unanimously.

II.—*Out of India, does the Asiatic cholera exist in our day in any part of the world in an endemic form?*

The Commission considers as demonstrated that the Asiatic cholera, wherever it appears, is never spontaneously developed, and has never been observed as an endemic (care must be taken to distinguish secondary foci, more or less tenacious in their character) in any of the countries which have been enumerated (Europe, &c.), and that it has always come from abroad. As for the countries in the neighborhood of India, while admitting it as probable that the cholera does not exist there as an endemic, the Commission does not feel itself authorized to come to any formal conclusion on the subject.

Adopted by all the members of the Commission, except MM. Polak, Sawas and Van Geuns.

III.—*Is there any reason to fear that the cholera may acclimate itself in our countries?*

The Commission, without rejecting the possibility of the fact, regards it as problematic.

Adopted unanimously.

IV.—*Is there in the Hedjaz an original focus of cholera, permanent or periodic?*

The Commission is of opinion that Asiatic cholera does not appear to have had in the Hedjaz its original focus, but it appears to have always been introduced there from abroad up to the present time.

Adopted unanimously, except by Mr. Goodeve.

V.—*Are there in India certain localities which have the exclusive privilege of generating cholera, or which are more particularly favorable to its development? In other words, is cholera endemic in all parts of India, or only in certain regions which it is possible to circumscribe?*

At this time the Commission can only answer that there are in India certain localities, comprised principally in the valley of the Ganges, where cholera is endemic, without being able to point out all of them, or to affirm that they have the exclusive privilege of giving birth to this disease.

Adopted unanimously.

VI.—*Do we know the causes by the concurrence of which cholera originates spontaneously in India, as well as the circumstances which make it take on an epidemic character?*

The Commission feels obliged to limit itself to answering that we know not the special conditions under the influence of which the cholera breaks out in India, and reigns there in certain localities as an endemic.

Adopted unanimously.

VII.—*What are the circumstances which concur in the development and the propagation of epidemics of cholera in India.*

The Commission believes itself authorized in answering, that pilgrimages are in India the most powerful of all the causes which tend to develop and propagate cholera epidemics.

Adopted unanimously.

SECOND GROUP OF QUESTIONS—THE TRANSMISSIBILITY AND PROPAGATION OF CHOLERA.

VIII.—*Is the transmissibility of cholera proved to-day by facts which do not admit of any other interpretation?*

Do not all these facts demonstrate conclusively that cholera is propagated by man, and with a rapidity in proportion to the activity and rapidity of his own movements? The Commission does not hesitate to answer in the affirmative.

Adopted unanimously.

The Commission, with unanimity, concludes that the transmissibility of Asiatic cholera is an incontestible verity, proved by facts which do not admit of any other interpretation.

Adopted unanimously.

IX.—*Are there conclusive facts which force us to admit that cholera can propagate itself at a distance by certain atmospheric conditions, by winds, or by any other change or modification of the surrounding medium?*

The Commission answers that no fact has proved, up to the present time, that cholera can propagate itself at a distance by the atmosphere alone, whatever may be its condition; and that besides it is a law, without exception, that never has an epidemic of cholera extended from one point to another in a shorter time than was necessary for man to carry it.

Adopted unanimously.

X.—*How is the importation of cholera effected, and what are the agents of its transmission?*

It may be said, without more specific statement for the moment, that if all modes of conveyance from countries affected with cholera are not likely to propagate the disease, it is none the less prudent, at present, to consider all such means of conveyance as suspected. A more detailed examination will settle the question.

Adopted unanimously.

XI.—*Under what conditions does man import the cholera?*

Man affected with cholera is himself the principal propagating agent of this disease, and a single cholera patient may cause the development of an epidemic.

Adopted unanimously; and—

XII.—The Commission has been led to conclude that certain facts tend to prove that a single individual (with much greater reason many individuals) coming from a contaminated place, and suffering from diarrhœa, is able to cause the development of a cholera epidemic; or, in other words, that the diarrhœa called premonitory is able to transmit cholera.

Adopted unanimously.

XIII.—*What is the period of incubation?*

In almost all cases the period of incubation, that is to say, the interval between the moment when the individual may have contracted the cholera poison and the commencement of the premonitory diarrhœa or of confirmed

cholera, does not go beyond a few days; all the facts cited of a longer incubation belong to the class where the contamination may have taken place after departure from the infected place.

Adopted unanimously.

XIV.—*Can the cholera be imported and transmitted by living animals?*

There is no known fact which proves that cholera has been imported by living animals; but it is reasonable, nevertheless, to consider them, in certain cases, as belonging to the class of objects called susceptible.

Adopted unanimously, except by MM. Bykow and Lenz.

XV.—*Can cholera be imported and transmitted by linen, clothing, and in general by articles in common use?*

Cholera can be transmitted by articles in common use coming from an infected place, and especially by those which have been used by cholera patients; and it also results from certain facts that the disease may be transported to a distance by these same articles when closely shut up from the outer air.

Adopted unanimously.

XVI.—*Can cholera be imported and transmitted by merchandise?*

The Commission, while admitting with unanimity the absence of proof of the agency of merchandise in the transmission of cholera, admits (by a majority of sixteen votes to six) the possibility of the fact under certain conditions.

The negative votes were those of MM. Bykow, Goodeve, Lenz, Pélikan, Polak and Van Geuns.

In consequence, until more fully informed, the Commission believes that it will be wise to consider as suspected, at least under particular and determined conditions, every thing coming *(toute provenance)* from a cholera district.

Adopted unanimously, except by MM. Goodeve, Pélikan and Polak, who declined voting.

XVII.—*Can the bodies of patients who have died of cholera import and transmit the cholera?*

Although it is not proved by conclusive facts that the bodies of patients dying with cholera can transmit the disease, it is prudent to consider them as dangerous.

Adopted unanimously, except by M. Sawas, who declined voting.

On the Influence of Means of Communication.

XVIII.—*What influence do the various modes of communication, whether by land or sea, have upon the propagation of cholera?*

The Commission answers, that maritime communications are, by their nature, the most dangerous; that it is they which propagate most surely cholera at a distance, and that next to them comes communication by railroad, which in a very short time may carry the disease to a great distance.

Adopted unanimously.

XIX.—*What is the influence of deserts upon the propagation of cholera?*

The Commission, resting upon facts established by experience, concludes

that great deserts are a most effectual barrier to the propagation of cholera, and it believes that it is without example for this disease to be imported into Egypt or Syria, across the desert, by caravans from Mecca,

Adopted by all the members of the Commission except MM. Monlau, Pélikan, Polak and Van Geuns, who declined voting.

The Influence of Crowding.

XX.—*What is the influence of crowds upon the intensity of epidemics of cholera, as well as upon the propagation of the disease? and under what conditions does it exercise its influence?*

All crowding together of human beings, among whom cholera has been introduced, is a favorable condition for the rapid spread of the disease—and, if this crowding exists under bad hygienic conditions, for the violence of the epidemic among them.

That in this case the rapidity of the extension of the disease is in proportion to the degree of crowding, while the violence of the epidemic is, other things being equal, so much the greater according as individuals have been little exposed to the choleraic influence or not at all; that is to say, in other words, individuals who have already been exposed to the influence of a cholera atmosphere enjoy a sort of relative and temporary immunity which counterbalances the bad effects of crowding.

Finally, in the case of a dense crowd, the more rapid its separation, so much the more rapid is the cessation of the epidemic, at least if new arrivals of unaffected persons do not furnish new aliment for the disease.

Adopted unanimously.

XXI.—*What is the intensity and what the tenacity of cholera epidemics on shipboard?*

The Commission replies that the intensity of cholera on board ships crowded with men is, in general, proportionate to the crowding, and is so much the more violent, other things being equal, if the passengers have not resided in the focus of cholera from which they started; that on crowded ships the spread of cholera epidemics is ordinarily rapid; finally, the Commission adds that the danger of importation by ships, and that of giving rise to a grave epidemic, are not entirely subordinate to the intensity, nor even to the existence of choleraic symptoms appearing during the voyage.

Adopted unanimously, except by M. Monlau, who declined voting.

XXII.—*What influence does the accumulation in lazarettos of individuals coming from a cholera district exercise upon the development of cholera among the people at quarantine and in the neighborhood?*

The Commission concludes that the crowding together in a lazaretto of people coming from a place where cholera reigns, has not the effect of producing, among the people at quarantine, a great extension of the disease; but that such a gathering is nevertheless very dangerous for the neighborhood, as it is calculated to favor the propagation of cholera.

Adopted unanimously, except by M. Monlau.

XXIII.—*What influence do great collections of men, in armies, fairs, pilgrimages, exercise upon the development and propagation of epidemics of cholera?*

The Commission concludes that great gatherings of men (armies, fairs,

pilgrimages) are one of the most certain means for the propagation of cholera; that they constitute the great epidemic foci which, whether they march after the manner of an army, or whether they are scattered as at fairs and in pilgrimages, import the disease into the country which they traverse; that these gatherings, after having been exposed, usually in a rapid manner, to the influence of cholera, become much less susceptible to its power, and that it disappears very speedily, unless newly arrived persons take the disease.

Adopted unanimously.

XXIV.—*What is the influence of dissemination upon the intensity and development of cholera epidemics?*

The Commission concludes that the breaking up of a collection of people, at an opportune time, may render less violent an epidemic of cholera and even arrest its extension; but that this scattering, on the other hand, gives rise to great danger of propagating it, if it take place in the midst of a region as yet unaffected.

Adopted unanimously.

XXV.—*What part belongs to the pilgrimage to Mecca in the cholera epidemics of our day?*

The part of the pilgrimage to Mecca, as an agent in propagating cholera as regards the neighboring countries of Europe (the only one with regard to which we have positive information), has been the introduction of this disease into Egypt twice, with an interval of thirty-four years, during the hot season.

Adopted unanimously, except by M. Polak, who declined voting.

The Influence of Hygienic Conditions.

XXVI.—*What is the influence upon the violence of cholera epidemics exerted by hygienic and other conditions of locality; in other words, what are the assisting causes of cholera?*

The Commission recognizes that the hygienic and other conditions which in general predispose a population to contract cholera, and consequently favor the intensity of epidemics, are: misery, with all its consequences; overcrowding, particularly of persons in feeble health; the hot season; want of fresh air; the exhalations from a porous soil impregnated with organic matters, above all with the dejections from cholera patients.

In addition, the Commission think that, as it appears demonstrated by experience that the discharges of cholera patients contain the generative principle of cholera, it is right to admit that drains, privies, and the contaminated waters of towns may become the agents for the propagation of this disease.

The Commission adds, that it seems to result from certain facts that the soil of a locality once impregnated with cholera detritus, is able to retain for a considerable length of time the property of disengaging the principle of the disease and of thus keeping up an epidemic, or even of regenerating it after it has become extinct.

Adopted unanimously, except by M. Pélikan.

Immunity from Cholera.

XXVII.—*How is immunity from cholera to be interpreted?*

The immunity which certain localities enjoy, that is to say, the resistance, permanent or temporary, general or partial, opposed by these localities to the development of cholera within their limits, is a fact which does not exclude transmissibility; but which indicates that certain local conditions, not yet entirely determined, are an obstacle to the development of the disease.

The same immunity, more or less complete and more or less durable, which the majority of persons in the midst of an infected district enjoy, an immunity which attests the individual resistance to the toxic principle, is a circumstance to which we should attach the highest importance.

In point of view of epidemic development, it is the corrective of transmissibility, and viewed with regard to prophylaxia, it sets in operation proper means to arrest the ravages of the disease.

Adopted unanimously, except by MM. Monlau and Pélikan, who declined voting.

Deductions Relative to the Generative Principle of Cholera.

XXVIII.—*From the facts above established, and which relate to the genesis, the propagation and the transmissibility of cholera, can we draw any precise conclusion with regard to the generative principle of the disease, or at least with regard to the media which serve as its vehicles or receptacles; with regard to the conditions of its penetration into the organism, the ways by which it passes out, the duration of its morbific activity, in a word, with regard to all its attributes, a knowledge of which is important to guard against it?*

In the actual state of science, we can only frame hypotheses as to the generative principle of cholera; we know only that it originates in certain countries of India, and that it dwells there permanently; that this principle is reproduced in man and accompanies him in his journeyings; that it may also be propagated at a distance, from place to place, by successive regenerations, without ever being reproduced spontaneously outside of man.

Adopted unanimously, except by M. Goodeve, who declined voting.

XXIX.—*What are the vehicles of the generative principle of cholera?*

Under the name of vehicles, the Commission intends to speak merely of the agents by means of which the morbific principle penetrates the organism. To this question the facts reply that the air is the principal vehicle of the cholera principle. . . . . . The action of the cholera miasm is so much the more sure as it operates in a confined atmosphere and near the focus of emission. . . . . . It seems that it is with cholera miasm as it is with the miasm of typhus, which rapidly loses its power in the open air at a short distance from its starting point.

XXX.—*To what distance from a focus of disease can the principle of cholera be transported by the atmosphere?*

The surrounding atmosphere is the principle vehicle of the generative agent of cholera; but the transmission of the disease by the atmosphere, in an immense majority of cases, is limited to a space very near to the focus of emission. As for the facts cited of transportation by the atmosphere to the distance of one or more miles, they are not sufficiently conclusive.

Adopted unanimously, except by M. Goodeve, who declined voting.

XXXI.—*Independent of the air, what other vehicles are there of the cholera principle?*

Water and certain ingesta may also serve as vehicles for the introduction into the organism of the generative principle of cholera.

This granted, it follows, so to speak, necessarily, that the passages by which the toxic agent penetrates into the economy are principally the respiratory passages, and very probably, also, the digestive canals. As for its penetration by the skin, nothing tends to prove it.

Adopted unanimously.

XXXII.—*What are the principal receptacles of the cholera principle?*

The matter of the cholera dejections being incontestibly the principal receptacle of the morbific agent, it follows that every thing which is contaminated by the discharges becomes also a receptacle from which the generative principle of cholera may be disengaged, under the influence of favorable conditions; it follows, also, that the origin of the cholera germ takes place very probably in the digestive canal, to the exclusion, perhaps, of all other parts of the system.

Adopted unanimously.

XXXIII.—*What is the duration of the morbific activity of the generative principle of cholera?*

It results from the study of facts, that in the open air the generative principle of cholera loses rapidly its morbific activity, and that this is the rule; but that under certain particular conditions of confinement, this activity may be preserved for an unlimited period.

Adopted unanimously.

Finally, the Commission adopts the following formula:

Observation shows that the duration of the choleraic diarrhœa, called premonitory—which must not be confounded with all the diarrhœas which exist during the time of cholera—does not extend beyond a few days.

Facts cited as exceptional do not prove that the cases of diarrhœa prolonged beyond that period belong to cholera, and are susceptible of transmitting the disease, when the individual affected has been withdrawn from all cause of contamination.

Adopted by fourteen votes against four, viz.: MM. Gomez, Millingen, Mühlig and Salvatori; M. Monlau declined voting.

Here end the labors of the Commission, with regard to the origin, the endemic condition, the transmissibility and the propagation of cholera, and the historic sketch of the march of the epidemic of 1865, made by a subcommittee of which Dr. Bartoletti was the secretary, before being presented separately to the Conference.

With regard to the different questions placed upon the programme, it is to be said, that by limiting themselves to drawing from facts the consequences which reasonably flow from them, the Commission thinks it has established sure foundations which will enable the Conference to pronounce understandingly upon all questions relating to prophylaxia.

Signed by A. Fauvel, *Secretary.*

The present report, having been discussed and adopted, chapter by chapter, was approved as a whole by all the members of the Commission.

CONSTANTINOPLE, *May* 21*st*, 1866.

Signed by all the members of the Commission.

VARIA.

PARIS, *July* 23, 1866.

To the Editor of the New York Medical Journal:

DEAR SIR—You probably have already seen in the medical journals of Paris notices of Dr. Guérin's (of subcutaneous section notoriety) new method of treating wounds of all kinds. He claims, by the use of his apparatus, to obtain immediate organization, without cicatricial tissue, without suppuration or fever, or, in fact, any of the usual inflammatory accidents which so often accompany severe operations. The principles of its action he holds to be atmospheric pressure and occlusion of the air. The first it meets; the second hardly, for he renews the dressings daily and exposes the wound to the air; and, moreover, it is impossible to obtain a perfect vacuum. The apparatus consists of a metallic receiver, where the vacuum is obtained. There is an indicator of the tension, and one or two stop-cocks. To one of these cocks is attached a rubber tube, thick enough to resist atmospheric pressure, and ending in a pouch of rubber extremely thin, and of such a size and shape as may be convenient for the part to which it is to be applied. I have been watching a case where Dr. Guérin applied his apparatus, and send you a brief account of it, as it may interest the profession at home. The case has done marvelously well, yet in point of time has nothing in it to do particular credit to the apparatus.

On Monday, June 18th, Jacques Delanch, æt. 63, laborer, had his thigh amputated at junction of middle and lower thirds by M. Maisonneuve, at Hôtel Dieu, for a suppurating white swelling of the left knee. The flaps were washed in pure alcohol, the artery ligated, and seven metallic sutures employed. Adhesive straps and a bandage wet with alcohol and water were then applied, and the stump was put into the rubber pouch. Then the mere turning of the stop-cock of the tube leading to the exhausted receiver finished the dressings. The apparatus has been adjusted daily, sometimes twice a day, until to-day, July 23d, when it was taken away, union being perfected. On the third day union had taken place at several points. On

the eighth day the two surfaces were almost entirely united, except at the point where the ligatures came out; here there was some pus. On the twenty-first day all the ligatures had come away, but slight suppuration continued, keeping a small sinus open until to-day, when, after five weeks, all seems to be closed. The patient was a bad subject, being old, thin, with soft muscles and very much run down. The weather has been extremely warm. The ward in the hospital is on the ground floor, and for the last ten days or more the cholera has been quite severe throughout the hospital. Notwithstanding these difficulties which had to be contended with, the patient's pulse, which is naturally ninety, never ran higher than one hundred and ten, where it was for one day only. There was no swelling or appearance of the slightest inflammation in the stump. The skin was constantly moist, warm and natural; tongue always good; appetite fair. He complained of but little pain throughout the treatment. It was a case where one would naturally expect a fatal result for an operation of such gravity, but which has done splendidly, although not quickly. Dr. Guérin says that eighteen or twenty days are ordinarily sufficient for union in amputations of thigh. He has only applied his apparatus some fifty to seventy-five times, but claims always to have succeeded perfectly. He says that his mode of dressing converts the wound into (as it were) a subcutaneous one. The parts are moulded to each other by the atmospheric pressure, and the discharges drained off by the tube. . . . .

The cholera is sweeping through the city again. About two-thirds die. It is kept as quiet as possible, and the papers say nothing about it. * *

THE BRITISH MEDICAL ASSOCIATION.—At the annual meeting of this association, holden at Chester, in August last, Dr. C. C. Cox, of Baltimore, Md., was present as a delegate from the American Medical Association. Dr. Cox was warmly welcomed by the president of the association, and responded in a speech full of good feeling, and conceived in the doctor's well known happy manner. Again, at the annual dinner, Dr. Cox responded to a personal toast in another speech characterized by marked elegance and appropriateness. The English medical journals express decided satisfaction at this the first occasion of the presence, in their own association, of an accredited representative from our great national medical assembly. It is to be hoped that the practice thus happily inaugurated will be continued from year to year, and that we, in our turn, may have the pleasure of welcoming their delegates in our Medical Association, and thus of

reciprocating the courtesy so handsomely extended to our representative. The tendency of such a course, not alone as an act of international comity, but as a means of uniting the profession in the two countries in more intimate and personal relations, cannot be other than beneficial.

The next meeting of the association will be at Dublin, and, in view of this, the election of Dr. Stokes as president for the ensuing year is very appropriate. Dr. Sibson, of London, succeeds the late Sir Charles Hastings as president of the council. The address in medicine this year was delivered by Prof. Bennett, of Edinburgh; in surgery, by Mr. Bowman; in physiology, by Prof. Humphrey; and in chemistry, by Dr. Bence Jones. *Apropos* of these addresses, *L' Union Medicale* says, in a somewhat splenetic mood, of the first two, that they contain only generalities to the glorification of Albion, about which nothing need be said now-a-days.

Dr. J. Theodore Calhoun, Brevet-Major and Assistant-Surgeon U. S. Army, died of cholera at Hart's Island, New York Harbor, on the 20th July, after an illness of but a few hours. Dr. Calhoun entered the army, at the opening of the late war, as surgeon of a New Jersey regiment. This position he resigned in 1862 to take a place in the regular army, entering as second in his class of seven members. He held a number of positions of importance, and was on active field duty with the Army of the Potomac for some three years. He was surgeon-in-chief, second division of the Third Corps, and afterwards assistant medical director of the corps. He was subsequently in charge of the Ward General Hospital, Newark, New Jersey. At the breaking up of this hospital he was transferred to Hart's Island. Dr. Calhoun was a man of untiring zeal and devotion to his profession, and of indomitable energy. He seemed on duty to know no such thing as fatigue, and his mind was equally active with his body. His contributions to medical literature were many and interesting, and were mostly communicated to the *Philadelphia Medical and Surgical Reporter*. Just entering upon life, as it were, for he was only twenty-seven years of age, he gave great promise of usefulness and distinction in his profession, and, "like a good soldier, he has fallen at his post, contending manfully against the deadly pestilence that is stalking in our midst."

Sir Charles Hastings, M.D., D.C.L., the founder of the British Medical Association and for twenty years president of the council of the same body, died at Worcester, England, on the 28th of July, at the age of seventy-three years.

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ORIGINAL COMMUNICATIONS.

Remarks on the Use of the Thermometer in Diagnosis and Prognosis. By AUSTIN FLINT, M.D., Professor of the Principles and Practice of Medicine in the Bellevue Hospital Medical College, etc., etc.

The present stadium of medical history is characterized by the introduction of several instruments for elucidating the phenomena of disease. Of these, the first to be named is the microscope, which has been efficiently applied to investigations of disease only within late years; instruments more recently introduced are the ophthalmoscope, the laryngoscope, and the endoscope; to these we would add the binaural stethoscope, invented by the late Dr. Cammann, which, sooner or later, will supersede all other instruments employed in auscultation. Last, but not least in importance, is the thermometer.

The thermometric phenomena of disease have been studied of late by clinical observers in Germany and Great Britain; the fruits of these studies have been communicated through medical journals, and they have entered somewhat into a few of the recent works on practical medicine. Hitherto, in this country, the thermometer has been but little used in medical investigations, owing, probably, to a prudential reserve with

regard to novelties. Many, however, are now interested in confirming, by personal observation, the correctness of what has been set forth in publications on the other side of the Atlantic. Impressed with a sense of the importance of thermometric phenomena, as entering into the clinical history of diseases, I propose in this article to give a brief account of some of the applications of the thermometer to diagnosis and prognosis. It is proper to state, at the outset, that my experience in the use of this instrument has extended over only a few months, but the short period in which I have used the thermometer in clinical studies has afforded striking illustrations of its practical value. I will add that I am led to write this article by a desire to enlist an interest wider than now exists in this new field of observation.

The use of the thermometer is essential for obtaining accurate, reliable information of the temperature of the body. The information obtained by merely placing the hand on the body of the patient is inaccurate and unreliable. If it be desirable to count the pulse and not trust to the judgment to estimate the number of beats per minute, it is far more desirable to ascertain the animal heat by means of a heat measurer. The sensations of the patient with respect to temperature, as every one knows, are extremely fallacious; he may suffer from a feeling of heat when, to the touch of another, the surface is cold, and *vice versa*. Of the places where the thermometer may be applied, clinical observers now agree that the axilla is to be preferred. The mouth is an unsuitable situation, because the rise of the mercury is affected by the current of air in the acts of respiration. The introduction of the instrument into other outlets is open to obvious objections. Held in the hand, the instrument does not give information of the heat of the body; the temperature of the extremities may be below, while that of the body is above, the normal standard of animal heat. In the axilla the temperature represents fairly that of the body, and the thermometer is secure against disturbing influences; the situation is accessible, and the instrument is applied without inconvenience either to the patient or physician.

In applying the thermometer certain rules are to be ob-

served. The bulb is to be introduced deep within the axilla, and the arm of the patient should be brought across the chest, so as to compress the bulb closely. The instrument is to be kept in place for from three to five minutes; or, until a minute elapses without any further rise of the mercury. The thermometer should be one made for clinical use. The tube at about two inches from the bulb extremity should be bent nearly at a right angle. The graduated scale should be on ivory or bone, and the lines so distinct as to be readily seen. The scale should extend from 80° to 112°. In the nicest instruments, each degree is subdivided into fractional fifths; but for clinical use, a subdivision into half a degree suffices. The graduation must, of course, be correct, and every instrument should be properly tested, in order to avoid error of observation. Thermometers for clinical use are now supplied by the surgical instrument makers of this city, and at a small price. The latter is an item of importance, in view of their liability to be broken.[1]

A complete record of thermometric phenomena during the course of a disease requires, at least, two observations with the thermometer on each day, viz., morning and evening. The record is still more complete if two additional observations are made, viz., at noon and at midnight. The results should be noted, and, for the purpose of keeping records, a printed table, with a space for noting the morning and evening temperature daily for a period of three weeks will be found very convenient. For the table which I use I am indebted to my friend, Dr. J. M. Da Costa. The morning and evening temperature is noted by dots, and these, connected by lines, present at a glance the thermometric record during the progress of the disease.[2] It is not necessary that all the thermometric observations be made by the physician; they may be intrusted to an intelligent nurse or assistant, after proper

[1] In this country and in Great Britain thermometers graduated in Fahrenheit degrees are used; in Germany and France they are graduated to Reaumur's or the centigrade scale.

[2] I have had this table stereotyped, and impressions may be obtained of Messrs. Baker & Godwin, printers, Printing House Square, New York. The table has also spaces for noting daily the respirations and the pulse.

instructions. In many cases, with reference simply to diagnosis, a single application of the thermometer, or its occasional use, suffices.

The laws of animal temperature in health are, of course, the point of departure for the study of the thermometric phenomena of disease. The normal mean of temperature in the axilla is about 98.4° Fahrenheit. There is a certain range of temperature consistent with health; climate, exercise, exposure to cold, mental emotions, etc., occasion variations within healthy limits. The maximum and minimum of these variations, however, do not rise above or fall below the mean temperature by more than one degree, except transiently; a rise above 99.5°, or a fall below 97.5°, if persistent, denotes disease.

Proceeding now to consider the thermometer as an instrument for diagnosis, its usefulness, in a large proportion of cases of disease, is based on the following general pathological laws: *First*, in all the essential fevers and in all acute inflammations there is more or less morbid increase of the temperature of the body; *Second*, in most non-febrile and non-inflammatory affections, the temperature of the body is not morbidly increased. Assuming a patient to have an acute disease of some kind, the thermometer in the axilla denoting a persistent temperature of from 101° to 105°, the question in diagnosis is, whether the disease be an inflammation or an essential fever; now, the local symptoms, under these circumstances, will be likely to point to the existence and the seat of an inflammation, provided inflammation exist, and, if such symptoms be wanting, the disease is an essential fever. The existence of an essential fever of some kind being thus ascertained, the symptoms and history will be likely to show what particular form or species of fever exists. On the other hand, let it be assumed that the existence of either an acute inflammation or an essential fever be doubtful in view of the history and symptoms, irrespective of temperature, the fact that the thermometer in the axilla shows no persisting increase of heat is sufficient to exclude both inflammation and fever. These points will be made more clear by citing some examples.

A case presents a group of symptoms rendering highly

probable the opinion that the disease is typhoid fever. Every physician knows that the diagnosis of this disease is frequently, during the first week, doubtful. The development of the disease is gradual, and for several days the obvious, distinctive traits are not fully declared. In such a case, while the physician is waiting for the characteristic abdominal symptoms, the peculiar mental condition and the eruption to appear, if the thermometer show the temperature to be persistingly increased, the mercury rising each day a little higher, but not exceeding 103°, with moderate fluctuations between morning and evening, it is almost certain that the disease will prove to be typhoid fever. If, on the contrary, the thermometer show the temperature to be within the range of healthy variations, it is certain that the disease is not typhoid fever. I have found the thermometric evidence of the existence and of the non-existence of typhoid fever useful in an early diagnosis with reference to the transfer of patients from Bellevue Hospital to Blackwell's Island—fever cases not being now treated at Bellevue. On the strength of this evidence, taken, of course, in conjunction with the history and symptoms, patients have been transferred before the eruption or other unmistakable characters of typhoid fever were manifested; and the question as to the transfer has been in other cases at once disposed of by the negative evidence which the thermometer has furnished.

In the differential diagnosis of typhoid and remittent fever, and in deciding whether these two forms of fever are combined or not, the thermometer furnishes important evidence. Periodical fever is characterized by a notable increase of heat in the paroxysms or exacerbations, the temperature falling nearly or quite to the standard of health in the intermissions or remissions; whereas, in continued fever the oscillations are less, and the temperature is steadily above the maximum of health. Since commencing to write this article a case has come under my observation which illustrates the diagnostic value of the temperature in this application. A patient in the country had been ill for several days with fever. Well marked exacerbations had occurred, but the case resembled other cases in the same neighborhood, in which the phenomena of typhoid and periodical fever have been combined. The attending

physician, a sagacious and skillful practitioner, was apprehensive that this case was of that character. But, on visiting the patient twice on different days, notwithstanding the pulse was from 80 to 90 per minute, the thermometer indicated the minimum temperature of health; hence the conclusion was positive that typhoid fever did not exist, and the correctness of this conclusion has been now proved.

It is well known that neuropathic affections sometimes simulate inflammations. As an example, pleurisy may be simulated by either intercostal neuralgia or pleurodynia. The pain in the latter affections is often as severe as, and similar in character to, that of pleurisy, and the pulse may be more or less accelerated. The diagnosis of pleurisy cannot always be made with positiveness, by means of physical signs, prior to the occurrence of liquid effusion; hence, for a certain period, an exploration of the chest does not enable the physician to exclude this disease. In fact, the physical signs in cases of intercostal neuralgia or pleurodynia, accompanied with considerable pain, are the same as in the first stage of pleurisy, if a friction murmur be not present in the latter disease—and a friction murmur is rarely appreciable in the first stage. The thermometer suffices to settle the differential diagnosis, provided the disease be not pleurisy; if the temperature of the body be not above the maximum of health, pleurisy may be excluded. In like manner, the thermometer may be appealed to for the exclusion of peritonitis in cases in which this disease is simulated by hyperæsthesia of the abdominal walls.

The following case illustrates the application of the thermometer to the diagnosis of a neuropathic affection. A young woman, for several days in succession, had accelerated breathing, the respirations being 30 to 40 per minute; she complained of suffering from want of breath, together with præcordial distress, and believed herself to be very dangerously ill. Her general aspect denoted great distress and danger. A physical exploration of the chest furnished a negative result. Aside from the symptoms just stated, there were no obvious manifestations of hysteria. In view of the absence of physical signs, the physician in attendance had considered the affection hysterical, but the persistence of the accelerated breathing,

with apparent dyspnœa, led him to apprehend there might be something more serious. The thermometer in the axilla showed no morbid increase of heat. This fact confirmed the opinion that the affection was neuropathic, and the progress of the case showed this opinion to have been correct; subsequently, well marked hysterical phenomena appeared.

Another illustration of the diagnostic value of the fact that in hysteria the heat of the body does not rise above the maximum of health was afforded by the following case. A female patient was admitted into hospital with notable rigidity of the muscles of the lower extremities. The question was whether the spasm was due to hysteria, or whether it might not denote either tetanus or spinal meningitis. The thermometer at once settled this question by showing a normal temperature.

Some examples have come under my observation of the value of the thermometer in cases of uræmia. Of these I select the following:

A young German immigrant was admitted into hospital with vomiting and diarrhœa, and no previous history was obtained. The dejections were not choleraic, and both the diarrhœa and vomiting were promptly arrested. The urine was scanty and not albuminous; the pulse was frequent and feeble; the surface presented marked capillary congestion, and he was greatly prostrated. On the third day he was somnolent, and he gradually became comatose without the occurrence of convulsions. After the coma was developed he came under my observation, and the diagnostic problem was, whether the coma depended on uræmia, on cerebral meningitis, or on typhus fever. Narcotism was excluded, inasmuch as the respirations were not diminished in frequency, and the pupils were not contracted. The symptoms pointed strongly to uræmia, but it was desirable to exclude effectually typhus and meningitis. This was done by the thermometer, which showed the heat of the body to be 97.5°. The patient succumbed, and the autopsical appearances, in connection with the history during life, led to the conclusion that the patient, when admitted into hospital, was in the stage of reaction after an attack of epidemic cholera.

A gentleman, aged about fifty-six, not known to have any

affection of the kidneys, not dropsical, and apparently in comfortable health, was suddenly seized with coma and epileptiform convulsions. He had several attacks of convulsions in quick succession. The urine, now examined for the first time, was found to be albuminous, and to contain hyaline, granular and fatty casts of the uriniferous tubes. Under the use of hydragogue purgatives and measures which induced free perspiration, the convulsions ceased, and he gradually recovered his mental faculties. The tongue was loaded, the pulse was accelerated, and it became a question whether uræmia alone existed, or whether there was some superadded affection. The thermometer showed the temperature to be 98°, a fact which excluded acute inflammation and fever, and the progress of the case confirmed the correctness of the conclusion based on the thermometric information.

To the rule that in diseases, other than inflammations and fevers, the temperature of the body is not raised, there are exceptions, and among the excepted diseases are the tuberculous affections. In cases of pulmonary tuberculosis, during the progress of tuberculization, the temperature of the body is more or less raised, the amount of rise being a criterion of the activity of the disease. This fact is sometimes of much practical utility, on the one hand, by confirming the diagnosis of tubercle, and, on the other hand, by excluding tubercle. Let it be supposed that, in a case of suspected incipient phthisis, the history, symptoms and physical signs are not explicit enough to render the diagnosis positive. Cases of this kind not infrequently occur. They are likely to occur more or less frequently with different practitioners, according to their knowledge of physical exploration; but, with never so much skill in percussion and auscultation, the diagnosis is, in some cases, for a time doubtful. Now, suppose that in cases of this kind the temperature is found to be more or less above the maximum of health, and that it is certain the patient is not affected with an essential fever or with an acute inflammation of any part, the increase of temperature renders the diagnosis of tubercle quite positive. On the other hand, let it be supposed that in a case in which there are some circumstances pointing to tubercle, exploration of the chest gives a negative result; but the physi-

cian cannot avoid apprehending that there may be a deposit which he fails to discover by means of physical signs. In such a case the thermometer, by showing the temperature of the body to be normal, enables the physician to conclude with confidence that the patient is not tuberculous. My experience for the past few months has led me to regard, as of not a little value, the aid thus afforded by the thermometer in deciding either for or against the existence of tuberculous disease.

In the diagnosis of a disease which every physician so much dreads to meet, viz., the so-called tuberculous meningitis, the thermometer promises to be of great value. Every physician of experience knows that this disease is developed insidiously, and that its developing stage is not infrequently simulated by merely functional disturbance of the digestive or the nervous system. Most of the readers of this article doubtless can recall instances in which, for many days, they have anxiously awaited the progress of events, fearful of the disease proving to be meningitis, but hoping that it might turn out otherwise. In such cases an abnormal increase of heat denotes either tuberculization or meningeal inflammation; whereas, if there be no abnormal increase, both may be excluded.

With these few examples of the use of the thermometer in diagnosis, I pass to consider, very briefly, the applications of this instrument to prognosis; and by the term prognosis I mean, not merely the prediction of the issue of a disease in either death or recovery, but a judgment of the favorable or unfavorable character of events occurring during the progress of a disease. There is reason to believe that, as entering into prognosis, the thermometer will prove to be of even greater practical utility than by affording aid in diagnosis.

With reference to immediate danger, the information which the thermometer affords is of the most definite character. The rise of the mercury to 105°, if not transient, always denotes great severity of disease, and the danger is increased in a geometrical ratio in proportion as the rise is still higher. On the other hand, a notable decline below the minimum of health may be not less definite as an unfavorable or fatal prognostic. Different diseases are found to have their typical ranges of fluctuation as regards temperature; and deviation from these,

in general, is unfavorable in proportion as the deviation is great. An unfavorable prognosis, however, is denoted by an increase much oftener than by a decrease of temperature.

The following case is interesting, considered in contrast with a case which I have already cited of accelerated breathing and dyspnœa due to hysteria: A male patient, admitted into hospital, stated that he had been ill for only three or four weeks; during this period he had had cough and expectoration, and he had raised blood. The respirations were much accelerated and the pulse was rapid. There was dullness on percussion over the left side, and on auscultation subcrepitant rales existed on both sides. These symptoms and signs denoted pulmonary tuberculosis, but not necessarily immediate danger. The thermometer gave a persistent temperature of 105°. This amount of temperature showed great activity of the tuberculous disease. Shortly the patient became delirious, and he succumbed within a week from the date of his admission. The autopsy revealed a large deposit of tubercle which had not softened; it was a case of rapid phthisis.

Clinical observation appears to show that in the essential fevers and acute inflammatory affections, the heat of the body is the most reliable criterion of either mildness or severity of the disease. As a rule, so long as the mercury rises to only 101°, 102° or 103° the prognosis is favorable. The oscillations proper to each disease are to be taken into account. In the extent of these, different diseases differ, but the law is that the maximum of increase is at evening and the minimum after midnight. So uniform is this law, that an equal temperature at morning and evening is unfavorable, and still more an increase of the morning over the evening temperature. A progressive decline of temperature is evidence of an approach toward convalescence, constituting what late writers have called defervescence. Frequently defervescence is characterized by notable oscillations on comparing the morning and evening temperature. Complete defervescence denotes completeness of recovery, whereas, if the temperature continue above the maximum of health, notwithstanding an apparent convalescence, the disease still lingers, or some sequel has occurred.

Again, a sudden rise of temperature during the progress of a disease may denote an important complication or intercurrent affection. On the other hand, a sudden fall of temperature below the minimum of health has been observed to precede a copious intestinal hemorrhage in the course of typhoid fever.

In cases of tuberculous disease, the thermometer furnishes reliable information in relation to the important question whether the disease be, or be not, progressive. Excluding coexisting or intercurrent affections which increase the heat of the body, tuberculization is going on so long as the temperature is more or less above the maximum of health; and an arrest of tuberculization may be predicated on a normal temperature taken in connection with other symptoms. With reference to this point I have come to consider the use of the thermometer as highly useful in the investigation of tuberculous cases.

In conclusion, the points presented in the foregoing remarks are recapitulated in the following propositions:

1. The thermometer is indispensable for obtaining accurate information of the temperature of the body, the perceptions of patients and the sense of heat or coldness communicated to the hand of the physician being alike fallacious.

2. In the essential fevers and all acute affections, the heat of the body is more or less above the maximum of health; and the increase of heat, as a rule, persists during the career of the disease. Fevers and acute affections may, therefore, be excluded by the fact of the heat of the body remaining within the limits of health; and the existence of an essential fever or an acute affection of some kind may be predicated on a persistent increase of heat.

3. A fever is purely malarial, that is, it is not a continued fever, nor is it associated with a continued fever, if, between the exacerbations, the temperature fall nearly or quite to the range of health.

4. The diagnosis of neuropathic affections which simulate inflammations may be based on the fact of the temperature not being raised.

5. Coma from uræmia may be discriminated from the coma

occurring in fevers or dependent on meningitis, by finding the temperature not raised; and in cases of uræmia, coma and convulsions, intercurrent inflammatory affections may be excluded if the temperature remain normal.

6. In tuberculous affections, when tuberculization is going on, there is more or less increase of heat. In cases of suspected tuberculosis, a normal temperature shows either that tuberculosis does not exist, or, if existing, that it is not progressive.

7. In cases in which the history and symptoms excite fears of the existence of meningitis, the existence of this disease is not probable if the temperature be not increased; and, on the other hand, increase of temperature sustains these fears, provided the patient have not an essential fever.

8. The amount of increase of heat, as shown by the thermometer, provided the increase be not transient, is proportionate to the gravity of the disease, and is a criterion of the immediate danger. A persistent temperature of 105° always denotes great severity of disease, and a still higher increase renders it almost certain that the disease will speedily prove fatal.

9. The temperature in the different essential fevers and inflammations is governed by certain laws as regards progressive increase, daily fluctuations, and the rapidity or slowness with which it returns to the normal standard (defervescence) of the time of convalescence. Each essential fever or inflammatory affection has its own laws in respect of the points of difference just named; and any notable deviation from these laws, in individual cases, is an unfavorable prognostic. Thus, a decrease of heat below the normal range may indicate an internal hemorrhage, and a sudden increase may point to an important complication or the occurrence of an intercurrent affection. Mildness of the disease, and the absence of complications or intercurrent affections may, on the other hand, be predicated on the disease pursuing its regular course as regards temperature.

10. The surest evidence of convalescence from an essential fever, or an acute inflammation, is a return of temperature to the normal standard. If an increase of temperature persist,

after apparent convalescence, or, in self-limited affections, after they have reached the end of their career, either morbid conditions pertaining to the disease continue, or some affection has been developed as a sequel of the disease.

Notes on Fractures of the Upper Extremity. By JOHN H. PACKARD, M.D., one of the Surgeons to the Episcopal Hospital, Philadelphia.

NO. II.—FRACTURES OF THE CLAVICLE.

The main points to be considered in this paper are connected with the mode of production of fractures of the clavicle, and the *rationale* of the displacement in cases of this injury. Some remarks will also be offered in reference to the treatment, both as influenced by and as in its results sustaining the views brought forward.

Let us first look at the anatomy and functions of the clavicle, and its relation to the surrounding parts.

The twisted shape of the bone, and the great differences between different individuals in regard to the degree of this curvature, are familiar to all who have given any study to the skeleton. Along the concavity of each curve the wall of compact substance is thickened, and the cancelli are found, upon section, to run in such a way as to give the greatest degree of strength.

Of course the clavicle, like any other bone, has no motions of its own; it obeys the forces exerted upon it by muscles. And I think it may be readily shown that the muscles concerned are those attached to the scapula much more than those directly inserted into the collar-bone. Let us first examine the ligamentous connections of the latter.

At its inner end the clavicle is closely bound to its fellow of the opposite side by the interclavicular ligament, to the sternum by the radiating fibres of the anterior and posterior sterno-clavicular ligaments, and to the first rib by the costo-clavicular or rhomboid ligament. Fastened in this way, the inner extremity of the bone has scarcely any mobility, its outer end,

however, ranging through an arc comparatively large. But this arc seems to be larger than it really is.

At the acromial end of the clavicle we find a small joint, the capsular ligament of which is strengthened above and below, and the degree of motion in which is much diminished by the coraco-clavicular ligament (conoid and trapezoid) passing up from the edge of the coracoid notch of the scapula to the under surface of the clavicle.

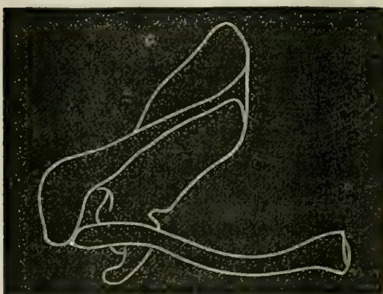

Fig. 1.

By removing all the other soft parts we may easily see how these ligaments oblige the clavicle to follow closely all the motions impressed on the scapula as a whole, or upon its acromial portion. These two bones form, therefore, a system, moving around the inner end of the clavicle, and seen from above in Fig. 1.

The acromial process comes outside of and a little in front of the tip of the clavicle.

Only five muscles are inserted into the clavicle: the sterno-cleido-mastoid, the subclavius, the anterior portions of the trapezius and deltoid, and the upper part of the pectoralis major. The last named, passing outward at a rather acute angle, acts in reality *from the sternum*, through the clavicle, upon the humerus. Between the trapezius and deltoid the clavicle and spine of the scapula form a sort of sesamoid bone, bringing the lifting power of those muscles, which are really but one, to bear from the spinal column upon the arm. As to the subclavius, it is but a check on the range of motion of the collar-bone, while the clavicular portion of the sterno-cleido-mastoid, even if wide, has the function rather of changing the position of the head than of raising the clavicle. The office of the costo-clavicular or rhomboid ligament is, in fact, not only to bind down the inner end of the clavicle, but also to supplement the last named muscle.

It is necessary now to look at the scapular muscles. The shoulder blade is interposed not only between the trapezius

and deltoid, but also between a group formed of the rhomboidei and levator anguli scapulæ, and another group formed of the teres major, teres minor and subscapularis. By means of these muscles, together with the long head of the triceps and the two heads of the biceps, a very beautiful and powerful mechanical system is constituted, controlling the motions of the upper arm; of this mention will have to be again made in connection with fractures of the humerus.

It remains to speak of a muscle which, together with the pectoralis minor, exerts a peculiar and most important effect upon the scapula. The *serratus magnus*, arising from the eight upper ribs, and inserted into the whole length of the inner margin of the posterior border of the scapula, draws the latter bone forwards around the thorax, while the pectoralis acts as an auxiliary and guide by pulling the coracoid process inwards. (Fig. 2. The dotted lines represent the muscles.) By the combined influence of these two muscles the clavicle is compressed lengthwise between the acromion process and the sternum. By means of them the action of pushing is performed, and by them the weight of the body is received in falling forwards, or, in the lower animals, in progression. By means of them, also, do we, in pugilistic phrase, "hit out from the shoulder." And to their action, I shall attempt to show, the deformity in fractures of the clavicle is mainly due.

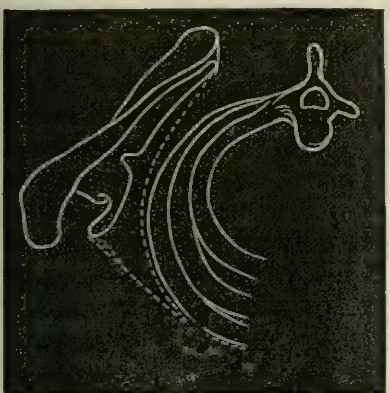

Fig. 2.

One other anatomical fact must be mentioned. The relation between the collar-bone and the first rib varies in different persons. In some the upper part of the thorax comes much more nearly to a point than in others, the arch of the first rib being smaller, and the bone itself more delicate. Again, in some cases the clavicle is much straighter, and stands out more directly from the sternum, than in others. I think these two

conditions usually correspond. Where the first rib forms a wide and strong arch, and the collar-bone runs somewhat backwards as well as closer to the rib, the two bones may even be almost in contact as far nearly as to the middle of the clavicle. Of the correctness of this statement I have satisfied myself, not only by the careful study of skeletons, natural as well as artificial, but by observations in the living and dead body. Its bearing will presently appear.

Around the sterno-clavicular joint, as a centre, all the motions of the upper extremity are performed. In the act of pushing, the trunk is fixed from the loins up, and the serratus magnus and pectoralis minor draw the scapula forwards, carrying with it the arm, forearm and hand; the clavicle is the stay of the upper part of the scapula, being compressed between it and the sternum. In pulling, the conditions are reversed; the trunk is fixed, the scapula drawn backwards by the rhomboidei, and the clavicle is drawn upon by its outer end, so that its sternal end, if freed, would fly forwards. In lifting directly upwards, the outer end of the collar-bone is drawn downwards (upwards also, indeed, by the trapezius), and its inner end would tilt up if cut loose from the sternum. The sterno-clavicular joint is therefore the point of fixation of the bony skeleton of the upper extremity.

Systematic writers mention three methods in which fractures of the clavicle may take place: direct violence, indirect violence and muscular action. Of the first and second of these the mechanism is generally thought to be understood; of the third I believe no explanation has hitherto been offered. For convenience I shall discuss the first and third together.

If the statement I have made as to the possibility of leverage of the clavicle over the first rib be accepted as correct, it will obviously account for some of these accidents, as, for instance, for the occurrence of fracture of the collar-bone by the recoil of a duck-gun. Any blow sustained upon the bone just outside of the point where it bears over the first rib will act upon it as upon a lever of the first order, the rib being the fulcrum, the attachment to the sternum the weight. Here the lever will give way at its weakest point, be this just at the fulcrum,

anywhere between this and the force, or just where this latter is applied.

So also in the case of muscular violence, as in Parker's case, where the clavicle gave way upon the patient's striking at a dog with a whip;[1] or in Malgaigne's, from great exertion made in lifting.[2] Hamilton's case[3]—in which "a large, well built and healthy man, aged thirty-seven, standing upon the ground, attempted to secure the braces of his carriage-top with his right arm, when he felt a sudden snap, as if something about his shoulder had just given way," and the fracture was recognized by Dr. Hamilton eight days afterwards—may, I think, be similarly explained.

One other case may, I think, be likewise explained on this theory, that, namely, recorded by Gibson,[4] in which an ignorant midwife broke the clavicle of an infant by pulling at the arm in trying to effect delivery.

In all these instances there is a power exerted upon the outer end of the clavicle, forcing it downwards in the case of a person striking or lifting, or pushing upwards; downwards and somewhat backwards when the accident is caused by a blow, or by the recoil of a gun. Sometimes the force may act merely in opposition to the binding down of the sternal end of the bone, which is very strong, and more so superiorly than either in front or behind.

It may be asked, however, why does not the first rib give way? Simply because the rib is at an advantage, being a strongly stayed arch, pressed upon at its convexity; while the clavicle is at a disadvantage, being subjected to a force at its concavity, tending to increase its curvature. In all the cases quoted of muscular action, and in most of those recorded from direct violence, the seat of fracture, if stated, was at or near and to the inner side of the middle of the clavicle.

Let me state distinctly that the idea I have endeavored to

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[1] Parker: New York Journal of Medicine, July, 1852.

[2] Malgaigne: Traité des Fractures et Luxations, tome i., p. 463. Packard's translation of vol. i., pp. 375-6.

[3] Hamilton: Practical Treatise on Fractures and Dislocations, p. 179. (1st edition.)

[4] Gibson: Principles of Surgery, vol. i., p. 255.

set forth is simply that in some persons (perhaps in but a small proportion, and chiefly in males) the clavicle is in so close neighborhood with the first rib that, upon the application of any force tending to carry its outer end either downwards or backwards, it may give way, just as a stick is broken over a man's knee. The bone, like the stick, will yield at its weakest point. And I offer this as the true explanation of those cases in which muscular action is the only assignable cause of the fracture.

Very possibly this leverage over the first rib may have something to do with some fractures by indirect violence, as when a man falls forwards on his outstretched hand, and the scapula being forced backwards by the head of the humerus carries the acromial end of the clavicle along with it. Where the first rib is thick and forms a large arch, the collar-bone would tend to be bent over it, and thus to be broken.

From the limited opportunities for investigating this point which I have hitherto had (perhaps forty or fifty subjects) I can only assert that such an anatomical formation does sometimes present itself, but can say nothing as to its comparative frequency.

We have now to inquire into the causes of displacement in fractures of the clavicle. It is usually stated that the shoulder falls, and is carried forwards and inwards; and that in the treatment we are called upon to raise it, and to carry it outwards and backwards. And these general statements are correct. Malgaigne mentions several changes in the relations of the fragments which are worthy of note. "The most frequent," says he, "is undoubtedly that in which the outer fragment is drawn downwards, and this comprises three varieties. Sometimes this fragment descends equally in its whole extent, and in a plane parallel to the sternal fragment; sometimes, although carried entirely below the other, it is more depressed at its acromial end; lastly, when the fragments are still connected, the outer one quite often inclines downwards by its acromial end, making with the inner one an angle salient upward.

"There are some fractures in which the outer fragment remains on a plane above that of the other." This is very rare.

"Overlapping comes second in the order of frequency. It is wanting in the majority of serrated fractures, especially in young subjects, and varies extremely in degree.

"In the third form of displacement the outer fragment is generally carried more or less back from the inner, while its acromial extremity is, on the contrary, carried forwards. If, on the contrary, the fracture is oblique inwards and forwards, the outer fragment almost necessarily rests in front of the other. The shoulder cannot then be carried forwards without great difficulty; the two fragments overlap without any angle, or with an angle salient forwards.

"Finally, M. Grout has pointed out a fourth form of displacement, the upper face of the acromial fragment looking forwards, its posterior edge being upwards. But this kind of rotation would seem to be entirely artificial, and due to excessive elevation of the shoulder in the course of the treatment."

M. Malgaigne says, further, that the inner fragment is also movable, being pushed in the opposite direction from the outer one, and being, moreover, drawn upward by part of the sterno-cleido-mastoid muscle, which, says he, "sometimes holds it with extraordinary force."[1]

Whenever complete detachment of the fragments from one another takes place, I believe overlapping must occur, and that, except in the rare cases in which the line of fracture runs obliquely from without inwards and from behind forwards, the inner fragment remains in front of the outer. And when there is not such a separation, but the periosteum or the jagged edges hold the fragments together, there is still a shortening of the bone—an approximation of the acromial and sternal ends. This is partly owing to the weight of the arm dragging down the scapula, and with it the outer end of the clavicle. But, especially when there is mere overlapping, some other cause must be found for the change, since the weight of the arm alone could not give rise to it.

Referring now to the description given on a preceding page of the muscles acting upon the clavicle and scapula, we find two which are adequate to the production of this displacement,

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[1] Malgaigne, op. cit., p. 468 et seq. Translation, p. 379 et seq.

and which, in my opinion, aid the weight of the shoulder very materially in bringing about most of the other forms, as mentioned by Malgaigne. The serratus magnus and pectoralis minor, and they alone, rock the scapula forwards around the thorax, and thus bring the acromion, pushing the outer fragment of the clavicle before it, nearer to the median line. Cut away all the other muscles and these must have this effect (see Fig. 2), while if they are removed the rest cannot, singly or combined, produce it. Should a fracture occur just within the insertion of the subclavius, this muscle would act in the same way, by drawing the outer fragment towards the sternum; but this would in most cases be only a trifling accessory.

In a previous paper I quoted the statements of Malgaigne and Hamilton as to the causes of displacement generally, and it will be remembered that among these the greatest importance was assigned to the fracturing force. The weight of the parts, and in a less degree muscular action, were also mentioned. But when the clavicle is broken, the stay against which the serratus magnus and pectoralis minor mainly act, and by means of which the shoulder and arm are enabled to act steadily, is taken away. Pushing, pulling and lifting are all rendered either impossible or very imperfect, until union takes place. Moreover, in many cases the fracturing force (as, for example, when this is a fall forwards) would tend to counteract instead of to produce the displacement, which occurs secondarily. Remedy the overlapping, or correct the angle formed by the fragments, and the moment the part is left to itself the muscles above named will contract and reproduce it.

The views now presented seem to me to be strikingly confirmed by the account given by Malgaigne of a patient of his who had sustained a fracture of both clavicles by being thrown out of a window, fifteen feet high, by a jealous husband. He recollected none of the circumstances of his fall except this. Non-union occurred in both bones, and the impairment of function was such that he could not resume his former occupation as a tinsmith, but became a tailor. He had been treated by means of a corset like that of Brasdor, with a pad in each axilla.

"Both clavicles had been broken at the middle; the two inner

fragments were nearly horizontal, and very distinct beneath the skin; the outer fragments had also a nearly horizontal direction, but were buried behind and below the others, to which they seemed to have no adhesions of any kind. The overlapping was considerable.

"When he stood up the two shoulders seemed lower, as well as carried further forward and inward, than in a healthy person. The one on the right side was higher, and at the same time closer to the sternum than the other. Posteriorly the scapulæ were separated from the spinal column by three or four inches, and inclined forwards and outwards; and, on the whole, the thorax seemed much contracted at its upper part.

"He could draw the shoulders back a little, but not enough to overcome their apparent prominence anteriorly. On the other hand, he could draw them together forwards so that they seemed like wings covering the chest, and leaving between them, in front of the sternum, only three inches space. In this movement the scapulæ *fitted to the sides of the trunk*, and the back seemed rounded from one side to the other, almost like that of a skeleton deprived of the upper extremities. The shoulders could be raised also at will, but not to any extent, from want of muscular power.

"He could raise both arms to a right angle with the trunk, but no higher; and in this movement the elbow had to be carried either forwards or outwards; to carry it backwards was impossible. The mechanism of this elevation of the arms was very curious to observe. It was first the whole shoulder which was raised, and which at the same time was carried forwards and inwards; when this motion ceased, the deltoid acted and raised the arm; the scapula remained almost immovable, and its inferior angle did not advance two centimètres even at the highest elevation of the arm. For the rest, whether the arm was raised by voluntary effort or passively, the movement was arrested at either side by a painful sensation in the axilla; the patient said that he felt a nerve stretched. . . . In all these movements of elevation the inner fragment of each clavicle was raised so as to make an angle of about 45° with the horizon; the outer one was raised also, but never as high as the other."

It does not seem to me necessary to point out the arguments afforded by this case, and especially by the first three paragraphs quoted, in support of the views I have advanced. The latter part of it strikingly shows how indispensable the clavicle is to the firmness and accuracy of movement of the arm.

Let us consider now the phenomena of those cases in which the clavicle is broken outside of the trapezoid ligament—that is to say, about an inch from its acromial extremity. Of this form of fracture an excellent account has been given by Mr. R. W. Smith, of Dublin.[1] His descriptions are borne out by two specimens, one from the Mütter Museum, and one lately presented to the College by Dr. W. S. Halsey, of this city. (See Fig. 3.) Unfortunately no history is attached to either of these specimens, nor to those dissected by Mr. Smith. Malgaigne mentions two cases of fracture at about one centimètre (about $\frac{1}{3}$ inch) from the acromial end, in which union had taken place. In each of these " the shoulder was depressed, and carried forwards and inwards; . . and to this inclination of the shoulder there corresponded posteriorly a notable prominence of the inferior angle and posterior edge of the scapula." Both the patients had perfect motion of the arm, except backwards.[2]

All of Mr. Smith's cases in which the fracture was seated outside of the trapezoid ligament (five of the eight), and the two specimens in the Mütter Museum (College of Physicians of Philadelphia), show the outer fragment at nearly or quite a right angle with the inner, the broken end of the former being sometimes in contact with the anterior wall of the latter. Fig. 3, taken from one of these specimens, illustrates the deformity.

How is this change of shape to be accounted for? Partly by the action of the clavicular part of the trapezius drawing up both the fragments, and favored in so doing by its attachment to the natural convexity of the bone. Partly by the tilting upwards and backwards of the lower angle of the scapula by the rhomboideus major muscle, aided by the weight

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[1] Smith: A Treatise on Fractures in the Vicinity of Joints, etc., p. 209 et seq.

[2] Malgaigne: op. cit., tome i., p. 493. Translation, p. 398.

of the arm dragging on the upper and outer angle of the bone, and through the acromion on the outer end of the clavicle. Chiefly, however, I think, by the serratus magnus and pecto-

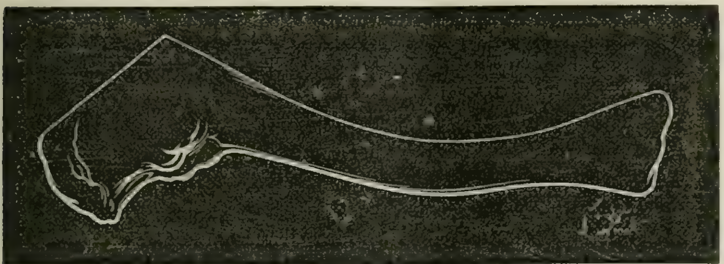


Fig. 3.

ralis minor carrying the scapula bodily forwards and inwards around the side of the thorax, and thus bringing the outer fragment into exactly the relation mentioned with the inner.

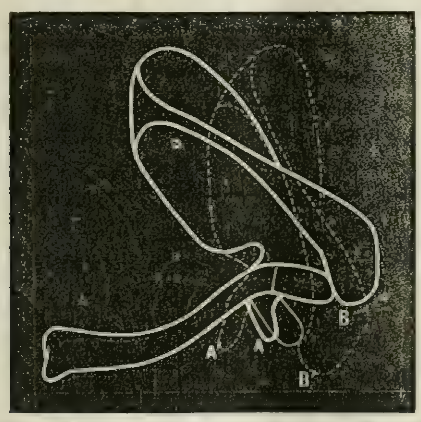


Fig. 4. Diagram showing changed position of scapula in fracture of clavicle near its acromial end.

The diagram (Fig. 4) will explain this view. Near the outer end of the clavicle will be seen a fine white line, showing the seat of a transverse fracture, and below this, also marked by a fine white line, the shape of the displaced fragment. The dotted line shows the change in position of the scapula, the coracoid A and the acromion B being brought to A′ and B′ by the agency of the pectoralis minor and serratus magnus muscles.

Of all the muscles connected with the shoulder these are, as as has already been said, the only ones which act directly in rocking the scapula forwards and inwards, so as to carry the acromion, and with it the outer fragment of the broken clavicle, in the same direction. They are of themselves adequate to produce the deformity, and the other muscles cannot do so without them.

It should here be remarked that there are other circumstances, such as the weight of the arm, the entanglement of the fragments and the fracturing force, which may modify very much the character of the displacement in different cases. But I hold that the muscular action mentioned is the chief cause of the maintenance of the deformity, and is sometimes the sole cause of it in the first instance.

It remains to inquire how far the principles stated in this paper are borne out by the results of treatment, and what value they have, if any, in a therapeutical point of view.

As is generally known, perfect cures have been obtained in fractures of the clavicle by simply keeping the patient on the back in bed. Here the weight of the arm is taken off, while the shoulder naturally falls backwards, and at the same time outwards. But besides this, the weight of the chest comes on the posterior or inner border of the scapula, and by pressing upon it tilts the anterior or outer border backwards, carrying with it, of course, the acromion and the outer fragment of the collar-bone.

All the plans which have from time to time been proposed of putting splints behind the back and fastening the shoulders to them, or of securing the shoulders by figure-of-8 bandages, operate on this same principle.

A new element, and one which has obtained in nearly all the forms of apparatus of modern times, was, I believe, introduced by Desault, namely, the wedge-shaped pad to be placed in the axilla of the injured side. The object aimed at with this pad is usually to act simply as a fulcrum, over which the humerus is made into a lever to force the shoulder outwards. Some surgeons endeavor also to lift the shoulder by its means.

Do we gain any thing by its use? I think not; and would

call attention to the fact that since its introduction there has, upon the testimony of writers generally, been no marked increase in the degree of success attained in treating these fractures.

An axillary pad of any firmness, bearing inwards upon the anterior or outer border of the scapula, must tend to rock it forwards around the thorax, and thus to bring the acromion forwards, with the outer fragment of the scapula, so as to maintain or even increase what overlapping or angularity already exists.

Nor do we, by bringing the elbow inwards and forwards, so as to use the humerus as a lever to force the shoulder outwards and backwards, accomplish much, for the capsular ligament of the shoulder is a loose one, and the motions of the joint are very free; the acromion, and therefore the outer fragment of the clavicle, will be but slightly influenced by so indirect a means, while the serratus magnus and pectoralis minor, slightly aided in some cases by the subclavius, are pulling in an opposite direction upon the scapula itself.

I have deemed it unnecessary to give an array of names connected with forms of apparatus which are probably familiar to most, if not to all, who may read these pages. The principle involved is the same in all. And the true principle, if my reasoning be correct, is to carry the *scapula* backwards. This may be effected by acting on the head of the humerus, either by a figure-of-8 bandage, properly applied and bearing upon the sound shoulder, the elbow being carried forwards and well supported, or by a cap of muslin or linen, so made as to embrace the upper part of the arm, and fastened in the same way.

An excellent and very comfortable contrivance for this purpose is described by Dr. J. C. Palmer, Surgeon U. S. N., in the *American Journal of the Medical Sciences* for July, 1863. His account being probably within the reach of all interested in the subject, I need not occupy space by reproducing it here.

A Case of Sudden Monocular Amaurosis, Presenting Unusual Difficulties in Diagnosis. By Henry B. Sands, M.D., Surgeon to the New York Eye and Ear Infirmary, etc.

[Read before the American Ophthalmological Society, June, 1866.]

It is now fifteen years since the invention of the ophthalmoscope. Few persons not practically familiar with its use can realize the influence which its employment, during this brief period, has had in modifying previously existing views regarding the pathology and treatment of the diseases of the eye. By enabling the surgeon to examine the crystalline lens and vitreous with a degree of minuteness hitherto unattainable, and by rendering distinctly visible the parts constituting the fundus oculi, which had previously been concealed from direct observation during life, it naturally led to the adoption of an entirely new system of classification of the more deeply seated ocular diseases—one in which vague conjecture was replaced by scientific precision. By the joint labors of a multitude of earnest investigators, a great variety of morbid appearances were soon detected and described, and their true nature made evident in the light of pathological anatomy. In the description and diagnosis of disease, refinements so nice as to excite a feeling of ridicule in the minds of the uninitiated found their justification in facts capable of easy and convincing proof. The gain to science was immense, and few persons at the present day will be found willing to dispute it.

As has happened before, however, in the case of the stethoscope, the microscope, and other valuable inventions, the new instrument failed to afford all the information that was demanded of it, and we are yet compelled to retain the unsatisfactory and unmeaning term "amaurosis" in the nosology of ophthalmic medicine. This is not owing to any defect in the instrument itself, but simply to the fact that its application is restricted to the interior of the eyeball; consequently important lesions affecting the sense of sight may exist in the optic nerve, or in the brain, which the ophthalmoscope is unable to reveal. Yet even here the more deeply seated disease generally leads to ultimate changes in the optic papilla and the retina, the observation of which, by the aid of the ophthalmoscope, is

often sufficient, if taken in connection with the history of the case, to establish a correct diagnosis.

These remarks may appear trite, but they seem naturally to precede the narration of a case in which the evidence afforded by the ophthalmoscope, although valuable, proved insufficient to explain all the symptoms presented by the patient under observation.

On the 13th of November, 1865, I was consulted by a medical friend, who told me that while dressing himself a few hours previously he had suddenly felt his left eye "dazzled" by the light of the sun. Presently he noticed that the sight of that eye was obscured, but supposing that the dimness would soon pass off, he immediately bathed his eyes in tepid water. Within fifteen minutes, however, from the time he first discovered the imperfection of his sight, vision of the left eye was entirely abolished. No pain attended the attack. He was certain that both eyes had been normal until that morning, as during the two or three days immediately preceding he had used the affected eye in looking through the microscope. The patient was twenty-seven years of age, and, with the exception of an attack of hæmoptysis, which had occurred eight years previously, he had enjoyed uninterrupted good health. He had never suffered from rheumatism.

On examination I found as follows: *Right eye*, normal in external appearance; vision perfect. *Left eye*, pupil considerably dilated when both eyes are exposed to the light, and greatly so when the right eye is closed; feeble contraction takes place only when light is admitted into the sound eye. Perception of light almost entirely absent, although patient can just discern the concentrated light thrown into the eye by means of the ophthalmoscope; tension normal.

Ophthalmoscopic Examination, 12, M., five hours after the attack. *Right eye*, normal. *Left eye*, media transparent; branches of central artery very small, being scarcely traceable beyond the papilla; veins hardly, if at all, diminished in size; at centre of macula lutea a circular disk, of a deep red color, sharply outlined, having about one-third the diameter of the optic papilla; the latter very pale and anæmic, contrasting strongly with that of the healthy eye; between the optic pa-

pilla and the macula lutea another deep red spot, resembling the first, but of nearly double the size, and having an irregularly oval shape, the long diameter situated in the horizontal median plane. The appearances thus described were also seen by my friends, Drs. Noyes and Althof. Careful auscultation of the chest failed to discover the least sign of cardiac disease, the presence of which, indeed, there was no good reason to suspect. The patient was directed to remain quiet, in a dark room, and to have six leeches applied to the left temple.

At 7 P.M. I saw him again, in consultation with Prof. Schweigger, of Berlin. Meanwhile, and, according to the patient's statement, before the application of the leeches, a decided improvement in vision had taken place, and he was able to count fingers at 2′ in several parts of the visual field. The latter, however, showed various interruptions, and central vision was absent. *Ophthalmoscopic examination:* Arterial vessels of the retina restored to their natural size; veins slightly turgid; retina gray and cloudy, especially around the macula lutea, where the red spot formerly mentioned still exists. The larger red spot near the nerve also remains the same. Patient ordered to have the eyes bandaged.

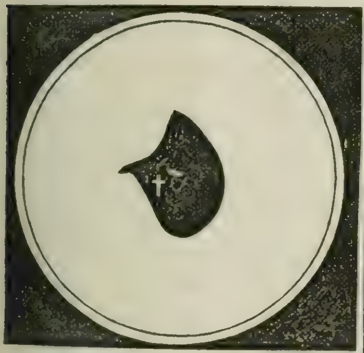
Nov. 15. Hardly any change. The visual field exhibits, beside other interruptions, a large central scotoma, about 7″ in diameter, at 1′ from the eye. Latterly, patient counts fingers at 3′, except when held above and to the right side. Ophthalmoscopic appearances nearly the same. The whole retina, however, is more decidedly cloudy, and conceals the choroid from view. The cloudiness is most marked in the neighborhood of the macula lutea, toward which numerous fine vessels are seen to converge. The two red spots still quite distinct.

Nov. 17. No change. Ordered potass. iodid. gr. v., ter in die.

Nov. 21. Vision a little improved, the central scotoma being smaller. The ophthalmoscope shows a nearly transparent retina, and also, for the first time, a swollen, reddish, infiltrated and dirty looking optic nerve, the contour of which is hazy and ill defined. Removed bandage from the eyes, and substituted smoke glasses.

Nov. 24. Still slight improvement in vision. Central scotoma a little smaller, extending principally to the right side of the centre of the visual field. *Ophthalmoscopic examination:* Retina nearly transparent; red spots less distinct; optic papilla still red and indistinct. Allowed patient to walk out, wearing the glasses. Iodide of potassium to be continued.

Dec. 5. Signs of neuritis disappearing, the nerve looking abnormally white, with irregularly notched margin. It is needless to give further dates of examination, except such as relate to the projection of the visual field. The accompanying figures represent the form and relative size of the central obscuration, which, it will be observed, diminished up to December 26; subsequently it again grew larger, and now has nearly its original form and dimensions. Its longest diameter, when measured upon a blackboard held at the distance of twelve inches from the eye, is seven inches.



Limit of central obscuration, Dec. 5, 1865.

Limit of central obscuration, Dec. 18, 1865.

Within the dark spot vision is wholly absent; eccentric vision, however, does not seem to be materially impaired. An ophthalmoscopic examination made a few days ago revealed the ordinary signs of atrophy of the optic nerve, which had a whitish, fibrous, glistening appearance, but was slightly, if at all, depressed. Both the arteries and veins were greatly reduced in size, the former being scarcely perceptible. Nothing special was seen at the macula lutea.

The case above detailed is the only one of the kind that has come under my observation, and possesses a singular interest,

I think, from the obscurity which attended the diagnosis. I have preferred giving at first a simple statement of facts, reserving until now the reflections which they suggest.

Limit of central obscuration, Dec. 26, 1865. Limit of central obscuration, May 1, 1866

In the first place, there can be no doubt that the loss of sight was sudden, as the patient not only remembered to have used the affected eye a day or two previously in microscopical examinations, but had also observed, within the space of a quarter of an hour, the change from mere dimness of vision to total blindness. In the next place, it may be fairly assumed that, when one eye is sightless and the other perfect, the lesion must be situated either in the eyeball itself or at some point between the latter and the commissure of the optic nerves. Any lesion involving the commissure, the optic tracts, or the tubercula quadrigemina, would, for anatomical reasons, necessarily affect both eyes at the same time. A similar statement may be made in regard to sudden blindness coming on after sexual excesses, long fasting, exhausting diarrhœa, sudden and copious hemorrhage, etc.; in all these instances both eyes are simultaneously involved. Among the causes of sudden blindness situated within the eyeball itself, if we exclude cases of injury to the cornea, iris, and crystalline lens, the most frequent are detachment of the retina and hemorrhage into the vitreous, either from the vessels of the ciliary processes, or of the choroid and retina. Here, too, the diagnosis is easy, and the difficulties are at once cleared up by the ophthalmoscope. Finally, we meet with instances in which the refractive media

are entirely transparent, and in which the retina shows no structural alteration sufficient to account for the total and almost instantaneous loss of sight. To this category belongs the case now under discussion.

In 1856, Virchow[1] gave the results of a post mortem examination of two women, who had died of puerperal fever, in each of whom he discovered evidences of acute disease of the interior of the eyeball, depending upon the presence of emboli in the arterial vessels; and he then predicted that many cases of amaurosis, occurring in connection with valvular disease of the heart, would find their true explanation in this occurrence. It was not long before his prediction was verified, for in 1859 von Graefe detailed, with great minuteness, the particulars of a case in which the diagnosis of embolus of the central artery of the retina seemed fully established. Subsequent post mortem examination proved the accuracy of this opinion, and some among us have been fortunate enough to see the beautiful specimen prepared by Dr. Schweigger, in which the embolus can be distinctly seen, completely occluding the central artery of the retina, just behind the plane of the lamina cribrosa. Since the date of von Graefe's publication, at least ten[2] additional cases have been recorded in foreign journals, in which the diagnosis of embolus was pretty clearly made out. The symptoms of the disease are tolerably uniform. Sudden blindness, with subjective luminous sensations, announce the invasion of the disorder. At this period, on ophthalmoscopic examination, the media are found to be transparent, the optic papilla pale, and both the arteries and veins of the retina reduced to an extreme degree of tenuity. After the lapse of some days or weeks,

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[1] Gesammelte Abhandlungen, pp. 539, 711.

[2] Blessig. Archiv. für Ophthalmologie, Bd. 8, Ab. 1, S. 216.
Schneller. Ibid., S. 271.
Liebreich. Deutcher Klinik., No. 50, 1861.
Pagenstecher. Mithcilungen aus der Augenheilanstalt zu Wiesbaden, No. 2, p. 275.
Just. Klinische Monatsblätter, Juni, 1863.
Saemisch. Ibid., Janv., 1866.
Hirschmann. Ibid.
Quaglino. Ophthalmic Review, April, 1866.
Quaglino. Ibid.
Fano. Annales d'Oculistique, t. lii., p. 239.

the vessels may partially regain their previous size, especially towards the periphery, probably from the development of a collateral circulation. The retina exhibits an opalescent opacity, especially near and at the macula lutea, the centre of which, however, is usually marked by a deep red spot, which, by some observers, is looked upon as an extravasation of blood, while by others it is ascribed to the natural color of the choroid, seen through the retinal substance (which, in this situation, is exceedingly thin), and contrasting with the grayish opacity of the surrounding infiltrated retinal tissue. The final result is usually atrophy of the optic nerve and retina, with nearly total loss of sight; and when vision is partially restored, it is generally limited to the eccentric parts of the visual field.

Now, in the case I have recited, although many of the symptoms above mentioned were present, I think we must reject the diagnosis of embolus for the following reasons: 1st. The absence of any evidence of cardiac disease. This alone, however, would not be decisive, provided all the other symptoms were present. 2d, and principally, because the phenomena of the retinal circulation, as revealed by the ophthalmoscope, cannot be reconciled with the theory of complete and permanent arterial obstruction, such as would be caused by an embolus. In every reported example of this affection, it has been noticed that both the arteries and the veins of the retina were greatly reduced in size. This is what we should expect, *à priori*, seeing that an embolus, while it would prevent the blood from entering the central artery and its branches, would in no way interfere with the return of the blood through the veins, which would, consequently, also be empty. But in the present case, the *arterial branches alone* were anæmic, while the veins were filled with blood. Furthermore, if the two red spots above described are to be regarded as extravasations, it may be inferred that the hemorrhages were the result of increased pressure on the walls of the veins, due to their congestion. That the red spot at the macula was hemorrhagic in character is, to my mind, evident, not only from its appearance, but also from the fact that throughout the whole course of the disease the total absence of central vision pointed strongly to the existence of a lesion at the yellow spot. The

other and larger red spot had also exactly the appearance of an extravasation, and its situation was such that it could hardly be regarded as the effect of contrast. Finally, it is to be observed that the symptoms of arterial obstruction were of but few hours' duration. The arteries which, at noon of the day of attack, were almost invisible, at 7 o'clock in the evening of the same day were seen by Dr. Schweigger and myself to be of their normal size. This fact would be difficult to explain upon the supposition of embolism.

The theory which appears to me to explain most satisfactorily the morbid phenomena in question, is that which assumes the primary lesion to have been an extravasation of blood into the sheath of the optic nerve, between the globe and the optic commissure. Such a lesion has not, so far as I am aware, been demonstrated by dissection, but several instances have been recorded in which the symptoms rendered its existence highly probable.[1] Hemorrhages in the substance of the retina and at the base of the brain are by no means rare, and it is quite possible that the same lesion may occur in that commissure which we call the optic nerve. My own solution of the present case would be as follows: at first, hemorrhage within the sheath of the optic nerve, compressing suddenly the nerve fibres, the central artery and vein. Hence, the empty state of the arteries, the fullness of the veins, and the general œdematous infiltration of the retina. Hence, also, total blindness, due partly to insufficient arterial supply, and partly to a diminution in the conducting power of the optic nerve fibres. Next, hemorrhages into the retina, owing to mechanical congestion of its veins. Later in the day, diffusion of extravasated blood, in consequence of which, the pressure being lessened, the arteries again filled with blood, and the retina again resumed its function, except centrally, where vision remained absent in consequence of hemorrhage at the macula lutea. Lastly, inflammation of the optic nerve, with its usual termination in atrophy. During the progress of the neuritis, I thought that the red discoloration of the optic papilla might be owing to the presence of extravasated blood,

[1] Hutchinson. Ophthalmic Hosp. Reports, vol. iv., p. 237. Pagenstecher. Op. cit., H. 1, p. 54.

which had found its way along the sheath to the surface; but I was not certain that I saw any thing more than the simple redness of hyperæmia.

I have spoken of hemorrhage *within* the sheath of the optic nerve, because if blood had been effused external to the sheath in sufficient quantity to have caused the symptoms mentioned, it would necessarily, at the same time, have exerted pressure upon the other nervous filaments traversing the orbit, and would have given rise to pain, strabismus, and other morbid phenomena, which were not present.

A Case of Sudden Monocular Amaurosis. By CHAS. M. ALLIN, M.D., Surgeon to the New York City Hospital, Assistant Surgeon to the New York Eye and Ear Infirmary.

[Read before the American Ophthalmological Society, June, 1866.]

The case which Dr. Sands has reported resembles so closely, in many of its features, that of a patient who came under my observation during the last summer, that I think it will be interesting to consider the two together. The result, in my case, was almost complete restoration of sight at the end of about six months.

Miss J., aged fourteen years, of a peculiarly nervous temperament, applied to me for relief on the 5th of July, 1865, stating that three weeks previous, while at school in the country, she suddenly felt a slight itching sensation in her left eye, and upon rubbing it a little, found that she could not see with it. The lids also of that eye were spasmodically closed. There was no pain, no giddiness, no disturbance of any other function. She had, as I learned, been much excited the evening previous, had cried much and slept but little during the night, and had had some headache early in the morning.

A physician of the place gave her some "eye drops," which she had continued to use, but without relief. No ophthalmoscopic examination had been made, so that I am unable to report, as Dr. Sands has done, what were the immediate changes in the appearance of the fundus.

When I saw her vision was still entirely absent. When the lids were forcibly separated there was no power of fixation, the globe moving spasmodically in every direction, the strongest tendency being to turn inwards. The pupil was rather *contracted*, and seemed to be slightly active under the influence of strong light. She could move the eye in any direction requested, but was unable to retain it in any one position.

With the ophthalmoscope I found the optic papilla of an almost perfectly blank whiteness, the arteries almost imperceptible, and the veins certainly not enlarged, but rather diminished, if at all changed. I could perceive no special change at the macula lutea, but the whole fundus was more pale than in the other eye. I suspected that she might be deceived, and that she might have always been blind in that eye, and had just perceived it, but she was confident that such was not the case.

I ordered her to take the iodide of potassium in large doses, and she continued it with commendable regularity until the 27th of August, when she was able to separate the lids by muscular effort, and could recognize the shadow of my hand in moderately strong light. The ophthalmoscopic appearances at this time were but slightly changed from those observed at the first examination.

On the 28th of September she had recovered control of the muscles of the globe, and was able to count my fingers at a distance of six feet, and could distinguish the letters in C of Snellen at two feet. I made no examination as to the field of vision. The optic disk now presented a pinkish appearance, though of not nearly so deep a shade as in the right eye, and the retinal vessels, both arteries and veins, were larger than at the time of the examination in July.

Soon after this visit she went into the country, and I have no record of the case until the 10th of January last, when vision seemed to be almost completely restored. She could read No. 3 of Snellen at eight inches, with ease, and could distinguish the letters in XXX at twenty feet. The interior of the eye now presented nearly its normal appearance. The arteries were not quite as large as in the right eye, and the optic papilla was somewhat paler.

In this case I think there can scarcely be a doubt that the loss of vision was attributable to a hemorrhage producing pressure sufficient to interfere with the function of the optic nerve; but while, in Dr. Sands' patient, it is quite probable that the hemorrhage occurred *within* the sheath of the nerve, in the case under my care it must have taken place further back and outside the sheath, involving in its pressure, though to a more limited extent, some of the branches of the third and fifth nerves. The effect upon these latter was apparently that of irritation rather than of paralysis.

Case of Opium Poisoning Treated with Belladonna, with Remarks. By S. Weir Mitchell, M.D., of Philadelphia.

Mr. P., æt. 59. Subject to attacks of depression of spirits, accompanied with irritative dyspepsia and oxaluria. Under the influence of such conditions, having breakfasted at 7, he took five grains of sulphate of morphia at about 11 A.M., and then lay down, desiring not to be disturbed. At 12, M., he he was seen, but attracted no attention by any thing in his appearance. At 1 P.M. a person who entered his room found him in a lethargic state, from which, however, he could be aroused. His hands were described as twitching, his face as darkly flushed. No one suspected that he had taken poison; but his state seemed so alarming that before I could reach him a neighboring physician, Dr. Drysdale, was called in. This gentleman states that he first saw the patient at a little before 3 P.M., that his pupils were contracted, that he was perfectly insensible, and had convulsive twitching of the muscles; "in fact, had the appearance of a person just recovering from a fit." As his face was still flushed and his extremities were cold, Dr. Drysdale placed the latter in hot mustard water and applied cold to the head. In a few minutes he became sensible enough to answer questions, the pupils remaining unaltered. At this time I saw Mr. P.; it was 3.15 P.M., more than four hours after he had taken the poison. He was intensely pale, his pulse 170, and very feeble. He was in a condition of stupor, but if shaken roughly, or sharply punched, could be aroused,

so much so that he told where he got the poison, how much he had taken, and at what time, and where he had put the wrapper which covered it. In all respects his replies proved to be correct, save as to the amount taken, which he said was ten grains; the apothecary insisted that it was only five.

While a messenger went for a stomach-pump, etc., I gave him, at 3.38 P.M., a rectal injection, containing one drachm of tincture of belladonna. At 3.40 he took forty grains of sulphate of zinc, which was repeated at 3.50, with abundant doses of warm water. At about the same time a drachm and a half of the tincture of belladonna was given by the mouth. At 4.5 the stomach-pump was brought. As up to this time the patient showed no signs of nausea, we concluded to empty his stomach by mechanical means. I felt the more inclined to this course because the mass of fluid in the stomach would have rendered absorption very slow, and I relied most upon the belladonna which I proposed to employ. We therefore pumped the stomach empty, and thoroughly washed it out. I do not suppose that we thus prevented the poison, or any of it, from acting. It was taken fasting, and over four hours had elapsed—enough of time, as I suppose, to enable the whole of it to enter the vessels.

At 4.25 gave three drachms of tincture of belladonna; at 4.45 P.M. two drachms; at 5.30 two drachms. Meanwhile he became rather less pale. He was kept awake by walking, and after 4.50 by this means and by applying vigorous electro-magnetic shocks to the ears, nose and nipples with a dry metallic conductor.

At 6 P.M. he lost power to swallow, and choked so violently at the first mouthful of coffee that we abandoned the attempt to give medicines by this channel. About this time he ceased to be able to walk, even with the aid of two persons, but could still be awakened by electricity. At 7 he was becoming more sluggish, pulse 150, respiration 40. I now injected into the left calf one-twelfth grain of atropia.

7.45 P.M. Worse. Intense sleep. Electricity no longer arouses him, and he endures without apparent sensation the most violent current used on the nose, lips and nipples.

At 8 more comatose. At this time the respiration fell to

10 per minute; pulse 140. The induction battery was used to regulate the breathing, and by it I caused the patient to breathe 20 times per minute. After an hour of uninterrupted treatment of this nature the respirations remained permanently at 16 to 20, and I ceased to use the battery.

At 8.30 P.M. injected one-twelfth grain atropia subcutaneously. He now began to get a little color in his cheeks. This was the first evidence of the atropia's acting. The pupils, up to this time very small, began to enlarge a little.

At 9.15, less flushed—pupils smaller—injected subcutaneously one-twelfth grain of atropia. At this time the pulse was 140, respiration 20. At 9.40 my friend, Dr. Maury, who kindly remained with the patient, repeated the subcutaneous injection of atropia, one-twelfth grain.

Between this and 10, when I saw him again, he became scarlet from head to foot; his extremities warm; tongue dry; pupils about middle size; slight twitching of the muscles; pulse 150; respiration 20. The redness diminished by 11 P.M., and was nearly gone at 6 A.M. next morning. The stupor lessened from 10 P.M.; the breathing, at this time stertorous and puffing, became easy and less and less labored. The pupils rested midway between dilatation and contraction. We were now well satisfied that the morphia was fully antagonized, and gave no more atropia. At 6.30 A.M. he opened his eyes, seemed conscious, and swallowed a glass of water readily. At 7 he was able to speak, but his voice was thick and whispering—pulse 134, respiration 20. Could see to count fingers and distinguish faces; had slight illusions and momentary wandering of mind; constant tremor of muscles; in fact, his condition generally reminded us of that of a man in delirium tremens. The bladder being paralyzed his water was drawn at 9 A.M.

12, M., pulse 124; respiration 20; twitching still; pupils midway; sleeps gently, and is easily aroused.

At 1 P.M. the tendency to sleep seemed to be deepening; 20 drops tinct. of belladonna were given by the mouth. Within an hour he became intensely flushed. Busy delirium set in, with twitching, especially of the left hand; tongue dry; pupils unaltered; pulse 160; respiration 22; wide awake all the time. I believe this additional dose of belladonna to have been

unnecessary. In fact it produced symptoms of atropial poisoning, such as to make me hesitate whether I should not check them by giving him morphia. I found, however, that by giving him whisky, one ounce every half hour, and later every hour, I was enabled to control the circulation, which fell, by 5 P.M., to 130.

During the day he had taken soup, and I now continued its use, giving also half an ounce of whisky every two hours after 7 P.M.

He remained feeble during the night, but slept at intervals, speaking rationally and more and more distinctly as the time passed by. At 10 P.M. I drew off his urine. Pulse 124; respiration 24; whisky to be taken every three hours; nourishment every two hours. At 11 A.M. next day I drew off his water again; pulse 104; respiration 19; tongue and skin moist; has ceased to twitch; voice clear; mind rational; ate a hearty breakfast. He experienced no further annoyance from the morphia or from the atropia used to combat its activity.

Remarks.—The cases in which atropia has been used to counteract the poisoning power of opium are now so numerous and so satisfactory as to claim for this method an absolute value. The usefulness of some of the reports as evidence is impaired by the fact that numerous agencies were resorted to before or during the employment of the antagonistic power of atropia. In the present case I endeavored to avoid this difficulty, and my faith in the main remedy was such as to justify, in my opinion, its isolated use. For a brief period, galvanic currents were so directed as to regulate, increase and deepen the failing respiration. Cold effusion was employed twice for a few moments without noticeable influence. With these exceptions, I relied solely upon belladonna and atropia.

It was therefore a fair test case, and has suggested to my mind certain observations, which, I trust, may not seem out of place.

The morphia—five grains, at least—was taken at 11 A.M. The man was seen at 3.15 P.M., when I gave him emetics, in accordance with usage. They failed to act as might have been expected. It was not likely that, having taken five grains of morphia, any was left in the stomach after four

hours had elapsed. I think, therefore, that we might have spared him the emetic. But having thus filled his stomach with mustard, warm water and sulphate of zinc, it would be in vain to expect a rapid absorption of the belladonna, which next I proposed to administer. We therefore emptied his stomach with the pump, principally to facilitate the absorption of the counter-poison about to be given. I think that, if no pump were at hand, I should use the belladonna by the rectum, rather than trust to the flooded stomach.

It will next be observed that, in accordance with rule, the patient was walked about until he dropped, although aided by two persons. In this case, and in all of which I have personal knowledge, the patient *at last* became comatose. Now whether the walking delays this stage, and whether, if it does so, delay is an advantage, admits of some doubt; for be it remembered that the effort to walk is a severe one, and of necessity very exhausting. It is possible that we are merely counteracting or suppressing one symptom of the group belonging to opium poisoning. If we could find a stimulus violent enough to keep cerebration active and awake, I can even conceive that a man poisoned by opium might die conscious, the rest of his brain and his reflex system becoming insensible to all their normal irritants. In other words, the power of the man to produce volitional walking movement and to answer questions is considered a test of safety, and so we pinch and walk him, etc. Yet an attentive observer may note the gradual narrowing of the pupil, the loss of deglutition, etc., and may see that these do not bear any relation to the success or failure of the attempts to rouse the patient. It would not be very difficult to show why this might naturally be anticipated. I was struck with the pallor and coldness of surface. When the atropia began to act I was about to take measures for warming the patient. In a case communicated to me by Dr. Jno. K. Kane these means were employed, and seemingly with good effect.

Dr. Brown-Séquard has shown that if two animals, alike in all respects, be given a dose of a poison such as opium, and one be artificially warmed, it alone will survive, while its fellow will die. I have myself repeated these observations, and

variously modified them, using different poisons. My results enable me fully to sustain the law laid down by Dr. Brown-Séquard. It would appear, therefore, that at a critical point in a poison case, we may save the patient from one element of danger by using artificial heat, and may thus tide him over the period of greatest danger. The use of artificial respiration in aiding this result is well known, and I need not urge it here. It is less well understood that a patient poisoned with opium may be dying of cold.

In my own case the induced currents were used to deepen, increase and regulate respiration at the turning point of the case. The battery was also employed to torture the patient into wakefulness. I am by no means sure that this portion of the treatment is useful, any more than the process of walking the patient about.

As regards the use of belladonna I have little to add, except to call attention to the fact that its influence appeared first in the scarlet flush on the skin, and secondarily in the pupils, which never became much dilated.

In many points this case verified the conclusions recorded by Drs. Keen, Morehouse and myself. (American Journal of Medical Sciences, July, 1865, p. 67.)

We usually found that atropia poisoning overlapped that by morphia. It was so in this case. We also asserted that both paralyzed the bladder, and that they would show no antagonism as regards this organ. This was well shown in the present case, where the bladder continued palsied even when the atropial activity was at its climax.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Malformations, Diseases and Injuries of the Fingers and Toes, and their Surgical Treatment. By THOMAS ANNANDALE, F.R.C.S., Edinburgh, Lecturer on Surgery, etc. The Jacksonian Prize Essay for the year 1864. Philadelphia: J. B. Lippincott and Co. 1866. 8vo, pp. 292.

This beautifully printed and neatly illustrated volume is the only book that treats specially of the malformations, diseases and injuries

of the fingers and toes and their surgical treatment, and, like many of the most valuable surgical monographs from the London press of late years—notably those of Mr. Henry Thompson—originated in an essay for the Jacksonian Prize, into which the author has now incorporated a number of additional facts and cases, and two short chapters on the resections and amputations of the digits. It is an excellent treatise on a class of infirmities very common, and which has received but little attention in the general works on surgery, and profit will be had from its perusal. Chapter I. treats of congenital affections of the digits of the hand and foot; Chapter II. of inflammatory diseases of the digits; Chapter III. of tumors of the digits; Chapter IV. of injuries of the digits; Chapter V. of non-congenital contractions and distortions of the digits; Chapter VI. of incisions of the joints and bones of the digits; Chapter VII. of amputations of the fingers and toes.

Mr. Annandale gives a case of that diseased condition of the nails which the French have called "psoriasis of the nails," regarding it as allied to the squamous diseases of the skin, and which was first described in England by Dr. Benjamin W. Richardson, who published several cases in his "Clinical Essays." In Dr. Richardson's cases the affection began with either numbness or tingling beneath the nails (of the fingers or toes), which become brittle, dark on the surface and shining, as if covered with a coat of varnish, and pitted and indented; they then shrink from the digits, and eventually are disintegrated. In Mr. Annandale's case, the nails of both the hands and feet were discolored, thickened and distorted, and several of the last phalangeal joints were swollen and painful. According to Dr. Richardson, the disease begins in the matrix, epithelial layers being interposed between the secreting membrane and the under surface of the nails, separating the structures; but the observations of Dr. Purser (Dublin Quarterly Journal of Medical Science, November, 1865) on two cases of this disease rather favor the view that it is the effect of a vegetable parasite, rather than of perverted development in the cells of the part. In the two cases reported by Dr. Purser, the alteration of the nail began at the root and extended downwards, the nails were much thickened, showed no lunulæ, and beneath them were found loose cells in abundance, and among them, especially in the deeper layers of the nail, a fungous growth, in which there was an abundance of spores. Dr. Richardson observes, "the causes of this affection are perfectly obscure." In one of Dr. Purser's cases the patient suffered from a secondary syphilitic eruption. Adopting the

French ætic view of the disease, both Dr. Richardson and Mr. Annandale recommend arsenic as the remedy.

In speaking of "Writers' Cramp," or "Scriveners' Palsy," Mr. Annandale alludes to Mr. Solly's views on the pathogeny of this infirmity, as recently expressed in his "Surgical Experiences," and adds, "our knowledge of the pathology of this disease is not, however, I think, as yet sufficient to determine the exact cause or seat of the complaint" (p. 248). Mr. Solly's theory of a centric origin of this disorder is, to our mind, worthy of respectful attention, and particularly so as coming from one who has for many years made it a special study, and has given in the work referred to an admirable and complete chapter on this disorder. Mr. Solly believes that the pathogenic condition is essentially a degeneration of the cervical enlargement of the spinal cord, the result of excessive and long continued use of those muscles brought into constant action by writing. Aching and uneasiness in the lower cervical and upper dorsal spinal regions are frequently complained of by sufferers from this affliction—and this has been noticed by Halse as well as by Mr. Solly. Musicians, who exercise continuously the same muscles, as well as penmen, suffer from it. The treatment of digital distortions by a system of special gymnastics, recently brought forward, and, as claimed, put into successful practice, is not noticed. Hasty operative interference in contraction of the digits is properly condemned, and mechanical means insisted upon. The great advantage to be derived from the judicious use of electricity might have been added.

Cholera: Facts and Conclusions as to its Nature, Prevention and Treatment. By HENRY HARTSHORNE, A.M., M.D., etc., etc. Philadelphia: J. B. Lippincott and Co. 1866. Pamphlet, pp. 79.

A Treatise on the Origin, Nature, Prevention and Treatment of Asiatic Cholera. By JOHN C. PETERS, M.D. New York: D. Van Nostrand. 12mo, pp. 162.

In Dr. Hartshorne's well written pamphlet the chief facts of the pestilence are agreeably condensed by one who has seen, read and thought much about the disease. His conclusions as to its nature, prevention and treatment are definite, and stated in pretty decided language. He has positive notions of his own, and he does not hesitate to make them known. The pathology of cholera he gives in a single word; it is a "poison-spasm," a "ganglionic tetanus." That

the vaso-motory centres are early and greatly implicated there can be no doubt. The analogy between many of the choleraic phenomena—the pulmonary, intestinal and cutaneous, particularly—and the results of Cl. Bernard's experiments on the sympathetic are, to our mind, conclusive on this point; but whether they are primarily or secondarily affected is certainly undetermined. That the whole pathogeny of the disorder is to be found in "disturbed innervation, involving chiefly the ganglionic centres of organic life," is unlikely, and Dr. Hartshorne himself says, "changes in the blood are *proved* to occur in it, and may well be believed to be primary." "We do not doubt," says Dr. Macpherson, in his late most excellent work, "Cholera in its Home"—"we do not doubt the existence of a blood-poison; but as we do not know its nature (very possibly it may be a ferment, some nitrogenous organized body), so we cannot yet talk with precision of its *modus operandi*." Dr. Hartshorne, in an excellent section on causation, full of facts, examined with great fairness and critical acumen, reaches the conclusion "that animal decomposition is the one great promotive cause of cholera, to which heat and moisture, etc., are only adjuncts." This opinion, he tells us, was first suggested by "the singular history of the outbreak at Columbia, Lancaster County, Pennsylvania, in September, 1854. It had never been visited by cholera before. In that summer "an excessive drought had reduced the channel of the river to an exceedingly low ebb, and in its bed, a short space above the town, a number of carcasses of sheep and other animals were putrefying rankly in the sun. A reservoir which supplied many of the people with drinking water was filled from the river not far from that spot, and the wind blew from it directly over the town." About the same time the Pittsburg epidemic broke out, and Dr. Hartshorne was informed "that the same condition of river existed there, with a like abundance of accumulated *putrefying animal matter*, exposed to the sun." Now let us hear the statement of Dr. John Atlee, of Lancaster County, Pennsylvania, of the origin of these epidemics, as given at the late meeting of the American Medical Association. "In July or August, 1859, a certain peculiar condition of the air existed. The water of the Susquehanna was very low, and the water of the basin very filthy, yet there was no cholera. One day, a car of emigrants came from Philadelphia to Columbia. Two or three of the passengers were ill, and were put upon the platform. They were conveyed to a shed. In the next twenty-four or forty-eight hours not one of them was living. In two or three days the cholera prevailed in Columbia. In the Lancaster County Hospital the winds were from the South.

We had no cholera. The same train conveyed the cholera to Pittsburg." These facts must have been unknown to our author. He believes cholera to be, " in very rare instances, and to a very limited degree, portable," and in his argument against the *communication theory* has fully availed himself of its weak points, though he makes no attempt to keep back the facts brought forward by its advocates, and which, to us, are so many and so unanswerable that we cannot help admitting its spread by human intercourse as one of the factors of its diffusion. Among the many striking and incontrovertible instances that cholera poison may be carried from one place to another by individuals, or in their luggage, is the outbreak of the disease at Marseilles in the autumn of 1865. But admitting all that is claimed and probable of the dissemination of the disorder by human intercourse —body emanations, gastro-intestinal discharges, fomites,—it is equally certain that, to account for its spread satisfactorily at times, we are obliged to own the agency of the atmosphere as a carrier, or epidemic constitution, and the influence of localizing conditions determining outbreaks and intensity. During the first two months after the landing of the French army in the Crimea, it lost more men from deaths and invaliding by cholera, than from gun-shot wounds from the battle of the Alma to the fall of Sebastopol; yet it brought no cholera with it, and there was none at the time of the disembarkation. The outbreak seemed to be due solely to atmospheric causes, and insanitary conditions. The organic theory, as a cause of epidemics, first broached by Kircher, sanctioned by Linnæus, and ably advocated of late years by Sir Henry Holland, Henle, Dr. J. C. Nott and others, was applied to cholera in England in 1849 and 1854, but, unsupported by observation, made little headway. Recently, there seems to be a tendency to a reconsideration of this hypothesis, which is certainly a very attractive one, and, if supported by physical evidence, would offer an easy and satisfactory solution of many of the moot points surrounding the dissemination of cholera. "Many of the phenomena observed during the march of cholera epidemics," writes Mr. Goodeve, "might be explained much more satisfactorily upon the supposition of the exciting cause being masses of organisms moving in obedience to atmospheric impulses and currents than by most other theories. They might multiply wherever they found a fitting nidus, which might be in privy atmospheres, or in air abounding in emanations from decaying and putrefying matter, or in crowded rooms, and, indeed, in all vitiated atmospheres. They might appear to impart an infecting character to the choleraic discharges by multiplying enormously in them." Dr.

Hartshorne is a decided advocate of the organic theory, and his hypothesis is, "that the cause of cholera is a (yet undiscovered) protozoon, or primal organism,[1] of extreme individual minuteness, which, on entering the human body, affects it as an organic poison," and that the conditions which "favor and maintain in life, multiplication, and migration this *ens primalis*" are afforded by "animal matter in a state of rapid and foul decomposition," along with moderately high temperature and ordinary moisture.

Dr. Lionel S. Beale, who has for some time been engaged in the study of the nature of the poison of contagious diseases, has, as the result of minute anatomical inquiry, reached the following conclusions: (1.) The contagious or infecting principle consists neither of insects, of animalcules, or any kind of vegetable organism. (2.) But of living matter formed in the organism of man or animals—the particles being exceedingly minute, and capable of retaining their vitality for a long time and under various conditions, although separated from the body. (3.) That these living particles bear somewhat the same relation to the germinal matter of normal cells that pus corpuscles or cancer cells do. (4.) And that the living contagious particle is not, therefore, of the species of a *parasite*, nor can it be regarded zoologically as a species, nor has it originated in the external world and grafted itself upon man; but it has originated in his organism, and is degraded living matter, descended from what was once normal living matter of the body itself.

Direct observation is yet lacking in support of the organic theory, and however plausible, satisfying and inviting it may be, positive demonstration of the existence of the organisms will be required before its advocates can ask for its general acceptance. Future microscopical investigations of air, after the method of Pasteur, may possibly settle the question. In treating of the causation of cholera, it is asked by Mr. Goodeve, and, we think, pertinently, whether it be not "more in accordance with facts to suppose that neither a miasm from without nor a miasm from within exclusively contains the specific poison? Might it not be that two factors are needed, the one some airborne material or some dynamic modification of atmospheric elements coming from without, the other some local element, neither being potent unless united?"

[1] The late Dr. Wilson and Mr. J. Cassin, of Philadelphia, have recently advanced the view that reason exists for distinguishing a third kingdom of nature, besides animals and plants, for which they propose the name of *primalia.—Proceedings of Academy of Natural Science.*

In accordance with his views of the nature of cholera, Dr. Hartshorne insists "that sanitary police includes the sum total of available measures for the prevention of cholera in any place," and, necessarily, that quarantine, as against its dissemination, is not available. "It never has succeeded and never can." The difficulty, we believe, lies in making the quarantine absolute. In proportion to its strictness is the risk from infected sources lessened It is relatively, if not positively, protecting; and this view, we think, is fast gaining ground, as the result of a large body of facts. If efficient, it stops one mode of diffusion, and that a pretty potent one.

Dr. Hartshorne, looking upon cholera as "symptomatically and pathologically a poison-spasm, or tetanus of the ganglionic system," his treatment is naturally the administration of anti-spasmodics and mild stimulants, at short intervals, with ice and external frictions; and this, he tells us, has been followed "with gratifying success," though some of his cases were of extreme severity. His chief prescription, slightly modified from that of the late Professor Horner, is as follows: ℞. chloroformi, tinct. opii, spr. camphoræ, sp. ammon. aromat. āā f ℥iss; creasoti, gtt. iij.; olei cinnam. gtt. viij.; spr. vini Gallici, f ℥ij., m. A teaspoonful to be dissolved in a wine glass of ice water, of which two teaspoonfuls are to be given every five minutes, followed each time by a lump of ice. Still Dr. Hartshorne confesses that in the collapsed stage "our art is very weak; fifty per cent. or more of collapsed cases die;" but to this he adds the consoling assurance that "cholera is not, after all, a hard death to die. To me it appears one of the easiest modes of exit from the world."

Dr. Peters' "Treatise," whose more appropriate title would have been, "Notes of my Readings concerning Cholera," is an exquisite specimen of type, paper and binding. It is an unpretending little volume, condensing within moderate limits, and in a very readable way, the current cholera literature; and those who have neither the time nor inclination to consult the originals, will find in this work a very reliable digest. With regard to the propagation of cholera, the views of the author are directly the opposite of those of Dr. Hartshorne. He believes it to be both portable and communicable, and that "the quality of infectiousness belongs peculiarly, if not exclusively, to the matters which the cholera patient discharges by vomiting and purging;" and goes so far as to assert that it never affects the entire atmosphere of any one country, district, town or village, and rarely that of the whole of one hospital, ship or house, but only those parts of them into which it is directly imported. This view, we

think, is directly in the face of facts in the history of cholera which cannot be gainsayed; yet it is substantially indorsed in the Report of the Cholera Commission, at its recent session at Constantinople, and published in the October number of the JOURNAL. The unanimous answer of the Commission to Question IX. is: "That no fact has proved, up to the present time, that cholera can propagate itself at a distance by the atmosphere alone, whatever may be its condition; and that besides it is a law, without exception, that never has an epidemic of cholera extended from one point to another in a shorter time than was necessary for man to carry it."

We should much like to see the evidence upon which this conclusion is based. Its spread over vast regions, regular development, decline, and disappearance, following the laws of other epidemics of acknowledged atmospheric origin, seem to us indisputable proof of the aërial mode of propagation, at least as one means of its dissemination; possibly not the most common or constant. The ætic potency of the rice-water evacuations, as an exclusive factor, appears to us over-estimated; how does it square with the mildness of the disorder towards the close of an epidemic, when nearly all the cases recover? From increase in quantity and concentration, there should be continuous intensity; yet such is not the case. Until very recently, in the Paris hospitals there was no separation of the cholera from the other patients, yet there has never been any general outbreak of the disease in any ward. Mr. Goodeve says that he has seen abundant opportunities for the diffusion of the poison from the discharges, yet it did not spread in the wards of his hospitals; and he remarks: "If fresh cholera discharges were so virulent, every bed next to a cholera-bed would be a bed of the disease. My own observation is, that no such evil results." The evidence of Dr. Morehead, Sir Ranald Martin, Dr. Baly, Dr. Walter Lewis, and others, is to the same effect. We think, too, that the influence of clothing and articles generally in common use, in the transmission of cholera, is too strongly stated by the author, though here again he is backed by the Commission. Both the reports of the late Dr. Baly and Dr. Walter Lewis, show the errors of some of the statements made respecting laundresses who were asserted to have caught the disease after washing the linen, etc., of cholera patients. Sir Ranald Martin says, that none of the washers of the clothing in the Calcutta European General Hospital, during a period of twenty-five years, had cholera. We attach much importance to the infection of drinking water by the choleraic evacuations, as at least a precipitating cause.

In treating of the Nature of Cholera, he advocates what he calls the physiological theory—not a very distinctive or appropriate name for the transudation pathology of the disease, and not very clearly described by him. How does this view of the pathogeny of the disorder account for those rapidly fatal cases where there are no evacuations? That copious fluid exudation is not necessary to account for the collapse, is proved by the precisely similar algid state in congestive paludal fever. Without suggesting any identity between the poisons of the two disorders, we suspect, as regards the phenomena of the collapse stage of both disorders, we must look to the nervous centres of organic life.

In concluding this notice of the two works before us—each excellent in its way, and both creditable to their authors—we must state our conviction, after reading much that has been written about cholera during the past year, that no substantial advance has been made in a knowledge of its nature, etiology, mode of propagation, or treatment; and that, in all essential points, we stand where we did in 1832. The most that has been done may be stated in the language of an esteemed contemporary: "Some hope has been given by recent events to the idea that, after all, cholera is to a great extent a preventible disease. We sincerely trust that this may prove correct." (B. and F. Med. Chir. Rev., July, 1866.)

I. *A Handy-Book of Ophthalmic Surgery for the use of Practitioners.* By John Z. Lawrence, F.R.C.S., etc., and Robert C. Moon, House Surgeon to the Ophthalmic Hospital, Southwark. Philadelphia: Henry C. Lee. 1866. 8vo, pp. 192.

II. *A Guide to the Practical Study of Diseases of the Eye.* By James Dixon, F.R.C.S. From the 3d Lond. Ed. Philadelphia: Lindsay & Blakiston. 1866. Cr. 8vo, pp. 400.

The former of these works is not only, as its modest title suggests, a "Handy-Book" of Ophthalmic Surgery, but an excellent and well digested *résumé* of all that is of practical value in the specialty. Within the past fifteen or twenty years innumerable contributions have been made to ophthalmology, many of which are so overloaded with pedantry and impracticable suggestions it is difficult for the student, or even for the practitioner who cannot devote special attention to this branch, to sift the wheat from the chaff. To such as these Mr. Lawrence's book is especially valuable, containing nothing but what is of practical moment, and, if we except here and there an

expression of questionable taste, nothing savoring of pedantry or affectation.

In their preface the joint authors call attention to their efforts to avoid all discussion of the remote causes of disease—limiting themselves in describing symptoms "to those essential to the *recognition* of disease;" in describing operations, etc., "to those details which are essential to its treatment." For a number of years the "letters" of all their hospital patients have been carefully preserved, and from these records of several thousand cases they justly consider an unusual reliability may be claimed for their practical deductions.

After a brief chapter on the "Methods of Examining the Eye," which contains some excellent remarks upon the ophthalmoscope test-types and the optometer, the authors consider in succession the general character of ophthalmic operations with the advisability of administering chloroform, diseases of the orbit, of the eyelids, the lachrymal apparatus and muscles, of the different tunics, and of the lens, assigning a separate chapter to each. The remainder of the work embraces the consideration of retinal affections, glaucoma, diseases affecting the whole eyeball, the physiology of vision, and the optical defects of vision.

In the chapter upon diseases of the conjunctiva the authors wisely make the secretion from the inflamed membrane their basis of classification, thus avoiding much of the confusion resulting from the old systems of division. They discard the use of mercury in all forms of iritis—whether wisely, in the syphilitic variety, may well be doubted; treating it as usual in other respects—especially emphasizing the importance of the constant use of atropine. Their descriptions of iridectomy and of the various operations for cataract are lucid and concise, as are also their remarks upon the retinal changes of amaurosis.

The subject of glaucoma and its treatment by iridectomy are fairly discussed, while for the treatment of ophthalmitis and sympathetic ophthalmia, as well as for the adaptation of artificial eyes, some excellent suggestions are made. The closing chapter, on the "Optical Defects of Vision," though evidently the most labored, appears to us the least happy section of the book. The questions of myopia, hypermetropia and astigmatism are clearly treated; but the anomalies of accommodation, instead of being simplified, seem to us more than usually obscure, from the arrangement and method the authors have adopted for placing them before their readers.

While there is much to praise, there is, however, little or nothing

to condemn in this book, which is not only well and appropriately illustrated, but is further enriched by a series of instructive cases appended to the description of each affection.

II. Of Mr. Dixon's "Guide" little need be said, as the work has been so long before the profession it is presumed the readers of this JOURNAL are already familiar with it. The fact of its reaching a third edition, both in England and this country, shows its utility as an index for those beginning the study of ophthalmology. The present edition is carefully revised and partly rewritten. It is creditably issued by the American publishers.

A Manual of Practical Hygiene, prepared especially for Use in the Medical Service of the Army. By EDMUND A. PARKES, M.D., F.R.S., Professor of Military Hygiene in the Army Medical School, etc. Second edition. London: John Churchill & Sons. Philadelphia: J. B. Lippincott & Co. 1866. 8vo, pp. 624.

Dr. Parkes' treatise on hygiene is essentially a manual intended to guide the medical officers of the British army in providing for the health and comfort of the men under their charge, both directly and indirectly, and in giving advice to commanding officers. It consequently embraces full directions for the examination of recruits; the analysis of water, of soil and food; the selection of sites for barracks, hospitals and camps, with details for construction and management of the same, together with the consideration of many other important subjects. It cannot therefore fail to be useful to those for whom it is intended, and we take it for granted that, as it has within two years reached a second edition, its merits are appreciated.

As "A Manual of Practical Hygiene," Dr. Parkes' book is not excelled by any other work extant; as a treatise on the subject in all its immensity and philosophy, it scarcely deserves consideration. The author never intended it to rank as such; his efforts have been directed almost entirely to questions of a purely practical character, and hence there is an absence of that logical statement of the laws and conditions of health which is to be met with in other treatises on hygiene.

Though useful and almost invaluable as a guide to the practice of analytical hygiene, Dr. Parkes' volume can never take the place of those treatises which consider hygiene as a science. Dr. Parkes refers to it as an art, and were any one to study his work with the object of mastering this great department of knowledge, he would

waste his time in a fruitless labor. He might as well take a work on analytical chemistry and undertake to learn the laws and principles of chemistry from it. To analyze water or food, or to determine the temperature or moisture of the atmosphere, certainly requires no hygienic knowledge on the part of the operator, and yet it is very important that all hygienists should be able to do these and many other similar things. In no other volume, to our knowledge, will the various processes requisite to the prosecution of inquiries in practical hygiene be found so fully and so clearly stated as in the book before us. It is easily to be seen that Dr. Parkes is fully acquainted with the science of health in all its ramifications, and we hope that at some future time he will see fit to write a work to which the present one will be the complement. To this day Great Britain has not produced one work upon the science of hygiene pretending to any degree of completeness. We trust she will not much longer labor under this reproach.

A Manual of Medical Jurisprudence. By Alfred Swaine Taylor, M.D., F.R.S., Professor of Medical Jurisprudence in Guy's Hospital. Eighth edition. London: John Churchill & Sons. Philadelphia: J. B. Lippincott & Co. 1866. 16mo, pp. 707.

Dr. Taylor's Manual has been so long before the public, and is so favorably known, that at this date it scarcely requires any notice at our hands. Some important changes, however, have been made in this edition that are deserving mention, as they materially enhance the usefulness of the volume, which, in its present form, is intended as a guide to students and junior practitioners of medicine and law, and not to take the place of the larger and more exhaustive work by the same author "On the Principles and Practice of Medical Jurisprudence."

Two chapters on evidence and the duties and responsibilities of medical witnesses are added and placed at the commencement of the volume. This arrangement is very appropriate, for a thorough understanding of this portion of the subject is implied in the skillful and accurate conduct of any case on the part of the medical witness. Our systems of medical teaching, as a rule, attach too little importance to the study of medical jurisprudence, and especially to this part of it—the presumption being that supplementary study, or the consultation of books, will enable the practitioner to qualify himself as occasion may require. This is essentially wrong, and the result of such a course is

that the most of our practitioners have no well defined notions of either their duties and responsibilities on the one hand, or their rights and privileges on the other, in medico-legal cases; and when called upon suddenly to give evidence, on which perhaps the life of a fellow-being may depend, they find themselves very inadequately qualified for the occasion, and too often their "appearance in the witness-box is only a signal for sport among gentlemen of the long robe." These chapters are concisely and clearly written, and are well worthy the most careful and earnest study. A slight modification in some particulars is necessary in their application to our systems of practice and the detail of our courts of law, but these will readily suggest themselves to any one of ordinary intelligence and education.

The second section of the book, devoted to poisons, is illustrated by numerous engravings (which are not found in the previous editions), representing the crystalline forms of poisons and the apparatus used for their detection. The seeds of all poisonous plants are also accurately delineated, both of natural size and as magnified by the microscope. The symptoms and post mortem appearances are given in the case of special poisons, and the modes of detection and analysis carefully described. These are classified and considered in order, as irritant poisons, metallic irritants, vegetable and animal irritants, neurotic (narcotic and cerebral) poisons, spinal and cerebro-spinal poisons.

The next section is devoted to wounds and personal injuries, and is one of the most interesting and valuable portions of the book. The application of the micro-spectroscope or spectral analysis in the detection of blood stains is here noticed, but does not receive that extended consideration which its importance demands.

Under the general head of asphyxia or apnœa are next considered deaths from drowning, hanging, strangulation and suffocation, and the fatal effects of lightning, cold, heat and starvation.

Then in order come the discussion of pregnancy, infanticide, legitimacy of offspring, rape and insanity.

These subjects have been somewhat reduced in extent by the omission of the details of cases which now find a more appropriate place in larger treatises above referred to, those facts only being retained which are likely to prove of practical value in the elucidation of the questions in point. These omissions, however, in no wise detract from the value of the book or the interest in its perusal; and the modest hope of the author, expressed in the preface, that this edition of the Manual will be found a convenient guide to medico-legal practice, is scarcely called for in a book which has so long and deservedly been recognized as a standard of authority on this subject.

A Manual of the Principles of Surgery, based on Pathology, for Students. By William Canniff, M.D., of the University of New York; late Professor of General Pathology and the Principles and Practice of Surgery, Univ. Victoria College, Toronto, C. W., etc., etc., etc. Philadelphia: Lindsay & Blakiston. 1866. 8vo, pp. 402.

This is an intelligently written and very creditable epitome of the principles of surgery, and does credit to the industry, practical knowledge, reading, and good sense of the author, who, in his preface, very modestly says: "That in these pages there will be found many imperfections is very well known, but the profession is requested to remember that this is the first undertaking of the kind in our young country. The writer enjoyed not the advantages of early literary training. As his grandfathers and his father were pioneers in the wilderness of Canada, and paved the way for a more scientific agriculture, so the writer hopes this volume will be the forerunner of other and more excellent treatises, that will hereafter proceed from the profession of our Province" (p. iv.) A good part of the work is devoted to surgical pathology, Dr. Canniff "believing that it is most essential to the knowledge of all rational treatment," and he has made very sensible use of the writings of Virchow, Rokitansky, Simon, and others. The "Manual" may be safely placed in the hands of the young student of surgery, as fairly representing the generally received surgical doctrines of the day.

The Common Nature of Epidemics and their Relation to Climate and Civilization; also Remarks on Contagion and Quarantine, from Writings and Official Reports. By Southwood Smith, M.D., etc. Edited by T. Baker, Esq., of the Inner Temple, etc. Philadelphia: J. B. Lippincott & Co. 1866. 12mo, pp. 130.

To Dr. Southwood Smith, more, perhaps, than to any other person, we owe the present advanced state of our knowledge relative to the laws which govern epidemics. If we had followed the excellent advice he gave, several years since, in regard to the inutility of quarantines, we should not now be ranked among the very few civilized nations which still submit to the hurtful restraints they impose.

The matter contained in the little work before us appeared originally in the form of lectures and official reports. These have been collected by Mr. Baker, and issued at a time when the wisdom they contain is capable of exercising a great amount of influence for the

welfare of mankind. We should be glad to see a copy of this book in the hands of every intelligent person in the land, satisfied, as we are, that its teachings would dissipate many serious errors, and be the means of inculcating many valuable truths.

The Physician's Visiting List for 1867. Philadelphia: Lindsay & Blakiston.

This convenient annual for 1867 is already on our table. It contains, in addition to the portion devoted to the record of daily practice, a useful variety of contents, viz.: almanac, list of poisons and their remedies, Marshall Hall's ready method in asphyxia, table for calculating the period of utero-gestation, etc. The utility of such a *vade mecum* depends in a measure upon the convenience of its size, for it is intended principally as an aid to the physician in maintaining punctuality in his appointments and accuracy in his accounts. In this respect the book is a success, for it is not incumbered with any useless material, and is altogether well adapted for the purpose it aims to accomplish. It is issued in several styles and for different numbers of patients.

REPORTS ON THE PROGRESS OF MEDICINE.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

1. *Wholesale Poisoning by Lead.* (Medical News and Library, July, 1866.)

During the past spring a large number of persons residing in the Walkill Valley, Orange County, New York, were attacked with symptoms of lead poisoning. A correspondent of the *Public Ledger* (Philadelphia) states that—

"After considerable research it was found that the lead was taken by the sufferers in bread and meal, and as a greater part of those staples were manufactured at a mill in Phillipsburg, an investigation was at once made in that direction, and the following facts were elicited.

"It appears that the proprietor of the mills had gained a reputation for the superior quality of his flour, and that the farmers for many miles around were in the habit of bringing their wheat and corn to his mill to be made into flour and meal. Aside from this, he exported largely, so that his mill was kept constantly going, by night as well as by day. One set of stones were set apart for his 'custom' work. This was an old set, constantly needing repairs, and large cavities frequently manifested themselves, which, instead of being filled up with the cement generally used for that purpose, were filled with common lead. Some of these holes were as large as a hen's egg—one, we are informed, being as large on the surface as the palm of a man's hand.

"If, when filled, the lead projected above the surface of the same, it was hammered down level. Of course the attrition of the grinding detached minute particles of lead from the stone, and mingled them with the flour. The lead thus communicated, when fermented and subjected to baking with the flour, was immediately transformed into carbonate of lead, one of the deadliest of poisons.

"As soon as it was ascertained that the disease originated from the bread eaten by the sufferers, samples of the flour were analyzed by Dr. Dorrance and Mr. King, a chemist, of Middleton. These gentlemen found, to their astonishment, that the lead could be discerned with the naked eye. It was, however, subjected to the usual standard tests, all of which revealed the presence of lead in considerable quantities. Of course these revelations caused a panic throughout the surrounding country.

"A statement of the leading physicians of this vicinity shows two hundred and thirteen cases of lead poisoning. I am informed that over one hundred cases have occurred in the vicinity of Goshen. Many of the victims are prominent citizens.

"I am informed that a quantity of the flour has been shipped to New York, and that seven cases of poisoning from it have occurred in that city."

2. *Increase of Insanity.* (British Medical Journal, April 28, 1866.)

Dr. Stiff, Superintendent of the Lunatic Asylum, Nottingham, in his last report, just issued, makes the following pertinent remarks: "The admissions, one hundred and nine, are twenty in excess of the previous year, the females predominating. A certain amount of this increase is probably coincident with that of the general population of the country, and the remainder may be accounted for by other circumstances. In the first place, persons formerly considered proper to be confined were comprised under the heads of lunatics, insane, or dangerous idiots; names of narrower and more definite signification in practice than that of unsoundness of mind, substituted in recent acts of Parliament. Persons suffering from acute and chronic diseases of the brain, the delirium of drunkenness and of typhus fever, the aged becoming childish and troublesome, imbecile children, and even those laboring under delirium in their last illness, are occasionally certified as proper cases to be taken care of in the asylum. The apparent undue increase of insanity of late years may, therefore, in part be ascribed to an extension of the term defining it, rather than to any spread of the malady itself."

3. *Poison on Draught.* (Boston Medical and Surgical Journal, June 21, 1866.)

The occurrence of two cases of poisoning by the drinking of a strong solution of cyanide of potassium by mistake for iced water in this city, within a few weeks, reveals a carelessness on the part of those who use this and similar deadly substances which demands public attention. The first instance was recorded in a recent number of this journal. A porter in a machine-shop, feeling thirsty, dipped a tin cup into a jar of liquid, which he supposed to be water, and swallowed about three drachms before he discovered his mistake. In two minutes he became senseless, and was taken to

the hospital, and, strange to say, after an emetic, the use of the stomach-pump and of ammonia, he recovered, for the amount of the poison swallowed was estimated at twenty-three grains, and thirty-five minutes elapsed before any of the remedies took effect.

The other case occurred a few days ago, under similar circumstances. A thirsty man, a stranger amongst us, went into a jeweler's shop, and asked for a drink of water. He was directed to the rear, where the sink was situated. Seeing a large covered stone jar standing near it, such as is often used for holding ice-water, he lifted the cover and drank, without stopping to look at it, about half an ounce of the liquid. He became insensible in five minutes. It was found impossible to administer an emetic of sulphate of zinc in the apothecary's shop whither he was at once taken, or later to use the stomach-pump at the hospital. He died in thirty minutes after drinking what he supposed to be a harmless draught of water. The liquid was a solution of cyanide of potassium in water, of the same strength as that swallowed in the first case, a pound to the gallon. The quantity taken was, therefore, about half a drachm of one of the most deadly poisons known, of which two or three grains are sufficient to kill a large animal, and five grains have destroyed human life in several instances. The prolongation of life in this, and the wonderful escape from death in the former case, were undoubtedly, in great part, owing to the fact that the stomach was filled with food, and that on this account the poison was not so rapidly converted into hydrocyanic acid and absorbed.

No coroner's inquest was held, we believe; but the case certainly was worthy of official inquiry, and, although there was no doubt of the cause of death in this instance, and the circumstances were well understood, the opportunity should not have been lost of a public exposure and reprimand of such culpable carelessness. This preparation is largely used in the arts, and we doubt not that an investigation would show that this and other deadly poisons are to be found in scores of places in this city under circumstances which haste or ignorance, or a mere accident, might convert into a similar tragedy. The excuse that one should not be foolish enough to drink liquids from glasses and vessels without knowing what they contain, in no way justifies or palliates such occurrences. They can be prevented by the use of significant labels and by lock and key, and those who do not observe such proper precautions should be held responsible for the results of their criminal indifference to human life. We are far too lax in our police regulations respecting the use and sale of poisons, and if the same energy which is exercised in the enforcement of the liquor and Sunday laws were turned in this direction, much good would result.

4. *The Micro-Spectroscope in the Detection of Blood Stains.* (Medical Times and Gazette, March 24, 1866.)

At the trial of Coe for the Mountain Ash murder, corroborative evidence of the presence of blood on the hatchet was furnished by the micro-spectroscope. Dr. W. B. Herapath conducted the scientific inquiry, and, we believe, has the merit of first using the micro-spectroscope in medico-legal inquiry. Of course, the evidence furnished by it cannot prove the presence

of human blood, but it may prove a valuable corroborator of other testimony. The following is Dr. Herapath's evidence.

Dr. Bird Herapath sworn: I am a Fellow of the Royal Societies of London and Edinburg. I practice as analytical chemist and also physician. The hatchet produced was given me by Mr. Wrenn, and I carefully examined it. On the metallic portion I did not find any marks upon which I could rely. I removed the handle, and experimented on thin slices of wood which I took from underneath the metallic ring. I examined those sections with a microscope, and found the majority of the stains were due to oxide of iron; some of them showed clotted blood; in some cases the woody portions had been infiltrated with the coloring matter of blood changed by the action of water. On some of the sections of the handle I found globules of blood, and by the micrometer I measured the size of those globules. I placed a section of the handle in a glass cell in which there was a fluid medium, and the blood globules floated off into the cell, and by the measurement of these I could determine the size of the globules therein contained. These globules were exactly the same size as some globules from dried human blood which I purposely procured, and tested with the same apparatus in the same way. Finding this evidence of blood to be small, I obtained more numerous sections of the colored surface of the handle of the hatchet—immersed them in distilled water, and obtained thereby a slightly colored solution, which, after filtering, was ready for chemical tests, and for optical examination by the micro-spectroscope. I subjected this fluid to the action of light, and it had, undoubtedly, the properties peculiar to a solution of blood. When a solution of blood was examined in this instrument (instrument here produced), the fluid absorbed some of the rays of light, and thus altered the spectrum or rainbow. Within the green and on the border of the yellow rays two dark absorption bands were produced by the blood fluid. Only one other substance would produce two dark bands—that is, cochineal dissolved in ammonia; but the position of the two bands was different. The spectroscope alone would not enable me to *readily* distinguish between the two, but combined with chemical examination it would satisfactorily do so. From this optical test I was satisfied that the sections of the hatchet had been stained with blood—and by chemical analysis I also demonstrated it was blood. The combination of the three tests showed that the substance on the hatchet must have been blood.

5. *Poisoning by Carbonic Oxide successfully Treated by Transfusion of Blood.* (Medical Press and Circular.)

Dr. A. S. Meldon reports an interesting case as having lately occurred in Berlin. Early on April 12th, a young man was found apparently lifeless on the floor of his apartment. Dr. Badt was immediately in attendance, and declared it to be a case of poisoning by carbonic oxide gas. He had the body at once removed to a spacious room having free access of air. Artificial respiration was had recourse to, and every effort made, both by Dr. Badt and Dr. Sachs, to resuscitate the man. At first there seemed but little hope; but the physicians had the satisfaction of perceiving a return of the natural respiration, accompanied by a feeble pulse. The patient gradually improved,

and there now seemed every prospect of recovery. Towards two o'clock, however, the pulse became almost imperceptible; the respiration became slow and short, and, in fact, all the symptoms of approaching death began to develop themselves. As the last resource, Dr. Badt proposed the operation of transfusion. Professor Martin consented to operate, and at three o'clock, assisted by his son, and by Drs. Badt and Sachs, he introduced a previously well warmed tube into the median vein, and slowly injected blood. The result was extraordinary: the pulse increased in strength, the respiration became deeper, the eyes immediately opened; the cheeks, before of a ghastly paleness, reddened, and in a few minutes the patient was able to swallow a little water. Nevertheless, he lay in an almost unconscious state till near midnight. The next morning, however, he was so far recovered as to be pronounced out of danger. The blood was taken from his brother, as well as from a commissionaire. Cases of poisoning by carbonic oxide gas are of frequent occurrence in almost every part of Prussia, owing to carelessness in shutting the valve of the stove, by which the gas, generated by the burning wood or coal, is unable to escape.

6. *Poisoning by Phosphorus.* (Medical Press and Circular, June 6, 1866.)

M. Bellini, in *Lo Sperimentale*, gives the following conclusions of his investigations on this subject. Phosphorus applied in the solid state to the cellular tissue is not sensibly absorbed, but as vapor or in dilute solution it may be absorbed and penetrate through the blood of the chyliferous system. Phosphorus, when it arrives in the digestive canal, is partly consumed in the stomach by the free oxygen which it finds there, and is converted into hypophosphoric acid; another portion is transformed into phosphuretted hydrogen, and a portion experiences no change. The acids formed are saturated with alkaline carbonates in passing through the intestine, and with bile and pancreatic sugar. The free phosphorus, phosphuretted hydrogen, hypophosphites and phosphates in contact with the blood combine with the arterial oxygen. According to M. Bellini, necrosis, caries, inflammation, softening, ulceration and intestinal perforation are due to the action of the acids of phosphorus; hemorrhagic congestions to the little coagulative power of the fibrin and the insufficiency of the oxygen. He considers that the discoloration of venous blood depends on the presence of hypophosphites and alkaline phosphates. In poisoning cases it is indicated to eliminate the poison from the alimentary canal by means of emetics and purgatives; to stop by means of ether the combustion of poison in the stomach; to administer mucilaginous substances, neutralize the acids with magnesia, cause oxygen to be inspired, and keep the patient in an etherized atmosphere.

The whole article is replete with valuable suggestions that might be made available in our system of medical jurisprudence, and we regret that our space will not allow of a more complete abstract of the same.

7. *Confessions of a Laudanum Drinker.* (The Lancet, July 14, 1866; reported by W. Whalley, Esq., M.R.C.S.)

On March 19th, 1866, I was consulted by Mrs. K——, aged forty-four, who has had eight children, three of whom are living, their respective ages being eighteen, sixteen, and six years. She is about the average height,

rather inclined to stoop, and moderately stout. Her hair is very gray, and her countenance had a rather withered, yellow aspect. Her eyes were glassy, and the conjunctivæ straw colored. When asked to put out her tongue she did so, tremblingly; it was coated with a brown fur. She complained of headache, loss of sleep and appetite, intense thirst, and her bowels were slightly relaxed. She stated that, owing to recent domestic adversities, she had indulged in whisky as well as laudanum; of the latter, the average quantity taken the last eighteen months had been a gallon a month. During this period the stomach has frequently retaliated and rejected its contents. She expressed a determination to relinquish the habit gradually, if possible, believing that death would be inevitable if the accustomed stimulus was suddenly withdrawn.

About fourteen years ago she suffered from severe pain in the bowels, for which a friend advised her to take twenty drops of laudanum. This she found to afford the desired relief, and on each accession of pain she at once resorted to the above remedy. In course of time the pain ceased to annoy her; but a desire for the laudanum had almost unconsciously been acquired, and unfortunately more courage and resolution were essential to its abandonment than fell to the lot of its victim. The habit became more and more confirmed, the craving for the stimulus became increased, and in order to produce the desired effect the dose was constantly augmented, so that after the lapse of a few years she was capable of taking a quart a week. More than this the stomach would not tolerate. Its effects upon her spirits were most exhilarating. She felt lively and cheerful, and could accomplish almost any amount of household work; and instead (as is often the case) of suffering from constipated bowels, with accompanying headache, they were invariably relaxed, and there was entire freedom from headache. She slept well, her appetite was remarkably good; in fact, there was very little, if any, disorder of the digestive organs. The organs of sense did not exhibit any signs or symptoms of impairment, except that of sight, which was not quite so good as formerly. If deprived of the laudanum for a single day, the most unpleasant symptoms came on: loss of sleep and appetite, and an indescribable feeling of languor, with a corresponding depression of spirits, and slight involuntary motions of the limbs, all of which were readily relieved by the accustomed dose of laudanum.

When first consulted by my patient, I fostered the most sanguine hopes of being instrumental in enabling her to conquer her defect. The whisky was discontinued, and the doses of laudanum decreased, and by the aid of salines, &c., her distressing sypmtoms speedily vanished, her appetite and usual flow of spirits returned, and she was soon engaged in her customary domestic duties. At this period, however, my hopes were suddenly and unexpectedly doomed to disappointment from the absurd intelligence I received from her nearest relatives, namely, that it was their intention to allow her the laudanum, but in smaller doses—they being infatuated with the idea that to discontinue its use entirely would be to endanger her life.

8. *Poisoning from Bite of the Rattlesnake.* (Chicago Medical Journal, Sept., 1866.)

An Irishman, about twenty-three years old, by occupation a professional

snake-tamer, was admitted into the county hospital, May 18th, about 11 o'clock in the evening, with a wound in the middle of the palm of the left hand, made by a rattlesnake five hours previously. The wound had been cauterized with nitrate of silver, and the man had taken rather freely of whisky. Condition, on admission, nearly comatose, surface cold, pulse not perceptible at the wrist, heart-beat feeble (55 per minute), respiration 14, labored, constant vomiting, both hands and forearms swollen and very painful, glands in left axilla swollen and tender.

Treatment.—Tr. iodine applied freely to the hands and forearms, sinapisms to abdomen, heat to extremities. Stomach rejecting every thing taken, six ounces of whisky were thrown into the rectum. Reaction soon began, and in the course of half an hour the pulse returned at the wrist, 80 per minute, respiration 18. Surface getting warmer, vomiting less frequent, and ceasing in the course of an hour, when about ℥ij. of whisky, with morphiæ sul. gr. $\frac{1}{2}$ were given and retained. He soon fell into a quiet sleep. No further medication during the night.

19th. Body warm; pulse about 80, moderately full; respiration 20, somewhat labored; moderate cough, with expectoration of bloody mucus; swelling of left forearm extending up the arm, right only to the elbow; severe pain in left, moderate in right; about the wound were several large vesicles filled with very dark, bloody serum; has had several bloody passages from the bowels; no blood in the urine—blood in the urine is common in these cases—tongue swollen to nearly twice the normal size. He being very filthy, was given a warm bath. Tr. iodine again applied to the hands and arms, beef-tea for nourishment, and milk-punch given freely. Sodæ sulphis, gr. xv., every three hours; morphiæ sul., gr. $\frac{1}{4}$, every three or four hours, to quiet the pain.

20th. Much as yesterday, except less pain; swelling subsiding in right limb; less cough, and expectoration not bloody; no blood in the passages from the bowels. Ordered flaxseed poultice to wound, and warm fomentations to the right hand and both arms. Other treatment continued, except the tr. iodine.

21st. To-day there is but little pain; swelling subsiding in both arms, he feels comparatively well every way, and is now out of danger.

In the course of a few days the swelling and pain entirely subsided; the wound healed, and the man was discharged, cured, May 30th.

9. *Poisoning by Silk Thread.* (Journal of Practical Medicine and Surgery, June, 1866.)

The silk thread used by seamstresses is liable to acquire poisonous properties in consequence of a fraudulent practice described as follows in the *Moniteur d'Hygiène et Salubrité Publique*, by Mr. Chevallier, Jun., the director of that periodical.

"The value of the best quality of silk varies from sixty to seventy francs a pound, and the material is sold wholesale by weight. For many years it has been the custom to increase the weight by steeping the silk in sugar and water, or in an infusion of gall-nuts; but this fraud not being found to yield sufficiently large profits a patent was taken out for another plan, which con-

sists in soaking the silk, whatever its color, in a bath of acetate of lead, and after drying the skeins, exposing them to a current of hydrosulphuric acid. The result is the deposition of a quantity of sulphuret of lead which greatly adds to the weight of the thread, and, therefore, to its mercantile value. We are acquainted with a person at the head of an extensive dressmaker's establishment who, from the use of silk thread thus prepared, was attacked, as well as her workwomen, with painters' colic; some of the women even lost their teeth, in consequence of their habit of biting off the ends of the thread, an operation during which they absorb a portion of the lead attached to it.

"The following is an easy method of discovering the fraud, which is sometimes carried so far that some silks have been found to contain as much as 23 per cent. of their weight of sulphuret of lead. Place a few threads at the upper part of a tube closed at its inferior extremity, and moisten them slightly with water containing a small amount of acetic acid or strong vinegar. When the silk is impregnated, add a few drops of solution of iodide of potassium. If any lead be present, a golden deposit of iodide of lead will at once betray the adulteration; and the weight of the iodide formed, and that of the silk before and after the operation, drying included, affords a clue to the quantity of lead introduced to deceive the purchaser—a dangerous kind of fraud, inasmuch as the action of the poison is slow and insidious and entails injury to the teeth, general intoxication of the system, paralysis of the intestines, and may even cause death."

10. *The Baneful Effects of Nicotine Prevented.* (The Lancet, April 7, 1866.)

M. Melsens has found that tobaccos, from various countries, contain nicotine in very different proportions. In tobacco from some parts of France (*e. g.*, the department of the Lot) there is 7.96 per cent. of nicotine, whilst Havana tobacco contains only 2 per cent. He proposes to smokers a way of preserving them from the effects of the alkaloid, and advises them to put into the tube of the pipe or cigar-holder a little ball of cotton, impregnated with citric and tannic acids. As the smoke passes through the cotton it will deposit the nicotine therein, in the shape of tannate and citrate. M. Melsens has made very ingenious experiments, which go a very great way to prove that he is perfectly correct.

11. *A Modern Hashish Eater.* (British Medical Journal, August 11, 1866.)

Under this title, Dr. G. Riedel of Berlin relates a case of poisoning by the officinal extract of the leaves of Indian hemp.

Of this, two scruples were taken at 9.30 on a Saturday night in last February by a druggist's apprentice, with the object of securing for himself that condition of "indescribable bliss, far exceeding all earthly delights," which, as he had read in Dr. Pfaff's book "On the Immortality of the Human Soul," was held to be procurable within an hour or two by the ingestion of two or three *grammes* of hashish. Soon after ten o'clock the attention of an assistant was aroused by the singular conduct of the youth, especially his fidgety and aimless movements about the shop. He openly confessed what he had done, and immediately after hastened, with an apparently unsteady gait, to

his bed-room on the first floor of a back building. Here he was, a few minutes afterwards, seen lying on the floor and partly under the table, wallowing about like a madman.

Dr. Riedel, when he appeared at 10.30, found him in bed, with his head and chest bent forward and his knees drawn upwards, motionless, in a sitting posture, in which he was supported by a wooden chest placed behind his back. The head was hot, the face intensely red, the eyes half open and staring at vacancy, the conjunctivæ moderately injected, the pupils active and of normal width, the expression somewhat diabolical, more malicious than anxious. Both his hands he held firmly pressed against the epigastrium; and it appeared that the extremely vehement impulse of the heart—perhaps also pain in the stomach—caused him to adopt this attitude. The respiration was in no wise abnormal; the radial pulse, moderately full, beat but ninety-six times in the minute; the heart sounds were normal. The temperature of the hands and feet was below par, but they, especially the former, were very red. There was no priapism.

It was obvious that the patient saw and heard what happened, and that he recognized the persons about him; but his psychical reaction on these outward impressions was inordinate. He swore, chided, and threatened to beat those who approached and touched or examined him; and even to his principal, whom he called correctly by his name, his expressions were harsh and rude. However, he did not offer any actual resistance to what was ordered for him. When told to do so he put out his tongue, which was clean and moist, and obediently he swallowed what was poured into his mouth.

Mustard poultices were applied to the extremities and a bladder of ice to the head. He received a powder of one scruple of ipecacuanha and one grain of tartar emetic. When asked whether he knew the remedy given him, he called it jalap; so his taste and smell appeared to be alienated. It was not until he had taken nearly four such powders, at intervals of ten minutes, that he began to vomit abundantly—and this was kept up for a while, camomile tea being administered for the purpose. The result was every thing that could be wished. At the bottom of the white basin into which he had vomited there appeared a pretty considerable quantity—at least fifteen or twenty grains—of the evidently not very soluble resinous hemp extract, which had been taken an hour and a half previously. Soon afterwards the whole condition showed a decided improvement. There was a change in the physiognomy; he no longer swore and threatened, became more affable, and his answers were more composed. The heat and redness of the face had abated, the hands and feet were warm, the heart quieter; but he said that his head felt still heavy, and he wished the cold applications to be continued. There was still a feeling of oppression in the cardiac region. After a copious motion had been produced by an enema of dilute vinegar, and he had slowly sipped a small cup of strong coffee without milk, he placed his body in a natural and semi-extended position on one side, and appeared inclined to sleep.

The next morning, at eleven o'clock, Dr. Riedel found him still asleep, the skin being moist and generally warm; the pulse quiet, of seventy beats; the appearance that of a sound sleeper. When awakened, he stated that he felt his head still somewhat benumbed. In the afternoon he took a long walk

with a friend, when he felt yet a little dizzy and confused; but the following morning he was able to attend to his duties in the shop as usual.

A week later, Dr. Riedel made some inquiries from his patient, in regard to the subjective symptoms. The first signs of the poisonous effects were said to have been an inclination to laugh, and an irresistible impulse to move about. This increased *pari passu* with an obnubilation of his senses, making him feel giddy and as if he were intoxicated. In this condition he had totteringly made for his bed-room, where he ran round the table, which occupied the middle of the room, until he fell on the floor, as he thought, without consciousness. How he had got into his bed he did not know, but remembered that the summoning of his master and of the medical attendant had filled him with anger, and that he had great difficulty to withstand the impulse to swear and knock about him. Of the lovely and delightful sensations hoped for he had experienced none—not any, even in his sleep. Instead, the fear of death and the feeling of repentance had harrassed him, and caused him the keenest pangs of conscience. It is, further, worthy of note that a variety of subjective colors, with a preponderance of blue and green, but without coalescence to harmonious shapes or images, had for a while disturbed his beginning sleep.

The effects of the poison were doubtless complicated with and qualified by those of psychical emotion. Besides, but a relatively small portion of the article was absorbed, and thus, by way of the circulation, allowed to affect the system. The case does not, therefore, warrant any definite conclusion regarding the sphere and mode of action of the cannabis extract. It may, however, safely be inferred that a peculiar excitation of the brain, not unlike that produced by intoxication, is one of the essential and primary phenomena of the poison's action. Whether the symptoms of great cardiac anguish, much resembling those of angina pectoris, without any commensurate acceleration of the respiration or dyspnœa, justify the assumption of an elective affinity of the extract to the cardiac plexus, however plausible it appear, Dr. Riedel prefers to leave in abeyance. (Deutches Klinik.)

12. *An Arsenic Eater.* By F. A. H. La Rue, M.D.L., Professeur de Médecine Légale et de Toxicologie à l'Université Laval, Quebec, C. E. (Boston Medical and Surgical Journal, June 28, 1866.)

During the winter of 1864–65, there appeared in the *Quebec Gazette* a series of articles under the heading of "Arsenic *vs.* Consumption," in which the writer maintained that arsenic was a powerful remedy against pulmonary consumption, and stated that he himself had used it as such with good effect, for many years, and was still in the habit of doing so from time to time.

Wishing to elucidate more fully what appeared to me an important fact, I waited on the editor of the *Gazette*, and requested him to put me in communication with the writer. He promised to do so, and a few days after a person called on me, assuring me that he would readily give me all the information I required.

We proceeded to my laboratory in the Laval University, and on my asking him what quantities he usually took, he said he knew little about doctors' weights and measures, but that he sometimes took *larger* and sometimes

minor doses. He then, with a small silver coin, scooped out from a bottle of pure arsenious acid what he termed a large dose, and which, on weighing, I found to contain somewhat over three grains; then a minor dose, weighing about a grain and a half. B. swallowed the last dose in my presence. I afterwards weighed another half grain, which he mingled with the tobacco that he was smoking, filling the laboratary with a strong odor of garlic. He remained with me three hours, after which he departed in perfect health, and without having shown the least symptom of disorder.

I lost sight of B. for some time, when, on the 26th of April last, I met him casually, and asked him if he still used arsenic. He answered by taking from a paper in his pocket several grains of arsenious acid and swallowing it without hesitation. I requested him to call upon me the next day at two in the afternoon; he did so, and we proceeded to my laboratory. I shall now take the liberty of transcribing, almost *verbatim*, the notes which I took during the course of the experiments.

April 27th. At twenty minutes to three, P.M., B. requested me to weigh him what I considered a reasonable dose. I accordingly, by aid of a small balance, the precision of which I had previously ascertained, weighed *two grains* of arsenious acid, chemically pure, and taken from my own laboratory. I presented him the dose. "Is that all?" said he; "you may treble the dose." Fearing to add too large a dose, I added but two more grains. B. then took the *four grains*, placed them on his tongue and swallowed them. He immediately afterwards lighted his pipe and conversed freely. I watched him constantly, to assure myself that he did not reject the poison.

3 P.M. I asked B. if he felt any unusual symptoms. He answered that the dose had produced on him no more effect than if he had taken a glass of cold water. At his own request I weighed another grain, which he mingled with the tobacco in his pipe and smoked it.

3.30. B. has not ceased conversing since he took the dose. He spoke chiefly on the wonderful properties of arsenic, related what he had heard said of the Chinese on this point, and explained his theories on the mode of action of this medicine. He alternately sits and walks, and smokes unceasingly.

3.45. He again assures me that he does not feel the least unusual symptom; he expresses a wish to take a glass of wine. Accordingly, I ask him to accompany me to a hotel, and at 4 o'clock B. took a glass of port wine and lighted a cigar.

At twenty minutes to five, exactly two hours after he had taken the arsenic, I told B. that he was at liberty to go away, on condition that he should call on me in a few hours, and consent to repeat the experiment another day. "Better do it at once," said he; "at any rate, I shall be at your house at half past six, when I will take a second dose and stay with you until midnight, if you wish it." I accepted his offer, and we parted.

At half past six, B. came to my house, as well as ever. During the interval he had gone to the Lower Town, to several places, and had not yet taken supper. "Hence," said he, "as I have come to remain with you till midnight, you must give me supper." I told him that, after some reflection, I did not like to assume the responsibility of administering him any more of the poison that day; that we would resume the experiment another day. B. remained with me till 7½, and left in perfect health.

28th. At 10½ A.M. I saw B. at his work. He was in high spirits, and assured me that he had not experienced the slightest inconvenience from the dose of the previous day. I again saw him at 1 P.M.; he was just dining very heartily, and to my inquiries whether he had had any evacuation from his bowels, he replied that he had not since ten o'clock the preceding morning, viz., four hours and forty minutes before he took the four grains of arsenic.

On the 27th (the day of the experiment) B. had breakfasted at 9½ A.M., on toast and chocolate, and at noon had taken a plate of pea-soup.

History of B.—Age, 47; temperament, lymphatic; good constitution; hair and whiskers reddish, both abundant—the latter sprinkled with gray. An Englishman by birth; B. has been in Canada since 1837.

B. has had three severe illnesses during his life; typhus (?) in 1839, an attack of cholera in 1849, and later *pulmonary consumption (?)*. Besides these, he has always been subject to what he calls bilious headaches. He lives regularly, but was formerly addicted to an inordinate use of strong liquors. His appetite is good; nevertheless, he has never been a great eater. His complexion (notwithstanding the popular opinion as to the effect of arsenic) is not clearer than ordinary. He has frequently made use of emetics and purgatives, which have produced on him the same effect as on others; he even asserts that he is very susceptible to the action of the latter. He takes a great deal of exercise, and smokes inordinately.

Phthisis pulmonalis is hereditary in his family. His father died of it at the age of 39. Four of his paternal uncles and several of his cousins have died of the same disease. His mother, however, died at a very advanced age, and there have been no symptoms of phthisis in her family.

In the year 1853 or 1854, B. thought he was attacked with consumption. He coughed painfully, was hoarse, became emaciated, and had profuse night-sweats. He one day read an article in an old periodical, in which arsenic was suggested as an excellent remedy for consumption, and determined to make a trial of it. He accordingly bought two ounces of white arsenic, and immediately began to use it, without having the least idea of the quantity to be taken. The doses which he then used were as large as those he now takes.

When he first began to take arsenic, he used it six or eight weeks consecutively, without any interval. Sometimes he took it five or six times each day; at other times three times a day, and sometimes only once or twice. He consumed the two ounces which he had bought in those six or eight weeks. He always took the first dose in the morning, about two hours before breakfast. At first, the morning doses had the effect of clearing his throat of a certain quantity of mucus, after expectorating which he usually felt weakness accompanied by cold perspiration—sensations, according to him, similar to those felt by a person who has just vomited. But the arsenic, he says, never made him vomit, nor even created nausea. While in this state, he generally dozed for a few minutes, and then smoked a pipe, mingling another dose of arsenic with the tobacco. In less than five minutes all these symptoms disappeared. B. does not now experience the same feeling after the use of arsenic. He is firmly convinced that he should have died of consumption long since had he not taken to the use of arsenic. He says that arsenic never caused any relaxation of his bowels.

B. is married and has a family of six children, all healthy; the eldest is 29 years old, the youngest 11.

B. is intelligent, and has received a good education. "I have read," said he to me, "all that the doctors say about arsenic, and feel convinced that they know nothing at all about the matter." He would not, on any consideration, take arsenic in a state of solution. His reading has made him familiar with the constitutional symptoms produced by arsenic, which he declares never to have experienced in the slightest degree, even after six weeks' constant use of the doses.

He withholds his name in connection with these experiments, lest, as he says, he might be looked on as a walking curiosity, and has consented to them simply from a desire to render some service to science.

He places greater confidence in the arsenic he smokes than in that which he eats; and whenever he has a cold he takes or smokes arsenic, which he always carries with him as a cure. He refrains from drinking water for some time after eating arsenic, but takes willingly a glass of wine or beer.

His general health is good, never suffers from pains in the stomach or bowels, which are regular in their action.

12. *On Mercurial Poisoning and its Prevention.* By Henry MacCormac, M.D. (Medical Press and Circular, June 20, 1866.)

The evils flowing from the respiration of mercurial vapor, in general, and in the case of mirror silvering, in particular, are well known to the medical, and, indeed, to the general public. Without a doubt, these evils might be lessened by strict attention to cleanliness and other precautions. Still, it would be a great deal better to abandon the silvering of mirrors by means of mercury altogether, the more so as procedures much superior, as well as entirely innocent, are now extant. Platinum can be precipitated in the metallic form on glass. But as silver—I do not mean quick or live silver—is much cheaper as well as perfectly effective, it ought everywhere be made to supersede the mercurial process.

Silver can be reduced to the metallic state on glass, first, by dissolving the metal in nitric acid. The solution is treated with ammonia and, then, in succession by solutions, severally, of oil of cinnamon and oil of cloves in alcohol, which solutions possess the remarkable property, in common with grape sugar, of reducing the oxide of silver to the metallic state. Petitjean's process, however, is, I believe, the one actually in vogue in France for silvering glass mirrors. I do wish and entreat that Dr. Mapother would introduce Petitjean's procedure among the mirror silvering artisans of Dublin, and so spare the poor fellows many a qualm and care. And, with this object in view, I shall, with your kind permission, describe it briefly.

Petitjean's Procedure for Silvering Glass.—Fifteen hundred and forty grains (1540) of the nitrate of silver are treated with 955 grains of the strong solution of *ammonia*, our *aqua ammonia fortissima*, then 7700 grains of distilled water. To this solution, when clear, add 170 grains of the tartrate of antimony dissolved in 680 grains of water, then 152 cubic inches of distilled water are to be added with agitation. When settled, the clear liquor is to be poured off. Then, to the solid residuum add other 152 cubic inches of distilled

water. The clear liquors are, now, to be put together, and add 61 inches cube of distilled water. This is silvering solution No. I. Silvering solution No. II. is to be prepared, as before, only with twice the amount of tartaric acid. A planed cast iron table, leveled with a level, and containing water at a temperature of 140°, F., gas heated, is the apparatus. The glass to be silvered is well cleaned with a soft cloth, then, with a plug of cotton dipped in the silvering fluid, to which a little polishing powder is added, lastly, with a second plug of dry cotton. The glass, laid flat on the table, is carefully covered with silver solution No. I. spread with a cylinder of India-rubber stretched on wood and cleaned with the solution. In from ten to twenty minutes the silver begins to be deposited. After a certain time, push the glass to the table edge, tilt so as to let the fluid run off, wash and examine. The next thing to do is to pour on silvering solution No. II., after which, wait, tilt, wash and dry. Finally, cover the work with red or black varnish. These mirrors are said to cost but 1s. 8d. per square yard for silvering. They do not spot, and are otherwise very beautiful and durable.

It is our bounden duty, I conceive, not merely to remove, but to prevent disease. Workmen are to be constrained, if needful, in respect of the observance of proper precautions. Ignorant masters are to be instructed, while the law should step in, in aid of science and humanity. The simple employment of head pieces, with glass mask and a double current of air passed through tubes, a very gentle application of steam power would suffice, together with washing the hands before meals, would render the most unhealthy callings, such as dry grinding and phosphorus match making, quite exempt from risk.

Summary.—*The Plea of Insanity in Relation to the Penalty of Death.* (Social Science and Sanitary Review, April, 1866.)

Dr. Daniel Tuke sums up an able paper on this subject—the said paper being in the form of a review of the report of the Capital Punishment Commission—with the following conclusions:

1. That the abolition of capital punishment would remove the uncertainty attending the conviction of those prisoners for whom the plea of insanity is set up, and would thus increase the authority of the law and the security of life, besides avoiding the risk of putting the insane to death and treating the sane criminal with the misplaced leniency deserved only by the insane.

2. That the abolition of capital punishment would practically remove the difficulties which now surround the plea of insanity in capital cases, and would greatly lessen, if not entirely terminate, the disgraceful collision of opinion which is now often witnessed in our courts of law, in trials for murder, between medical witnesses, and which further occurs in regard to the legal definition of irresponsibility between medical men and lawyers.

3. That the descriptions, given by the press, of convicts condemned to death, and of the execution, operate upon a certain number of minds injuriously, and lead, in some instances, to a morbid imitation of the crime for which the criminal has been executed.

4. That, regarded from a psychological point of view, there appears to be no fatal objection to the proposition of life-long punishment, provided

certain precautions are taken to prevent depression and exhaustion of the mental and physical powers.

Traumatic Idiocy. By DR. A. MITCHELL. (Edinburgh Medical Journal, April, 1866.)

Dr. Mitchell, who is the Deputy Commissioner in Lunacy for Scotland, here brings forward a series of observations to show that there is an appreciable amount of idiocy resulting from accidents, and that many of these cases are of a preventible character. The term in itself has no important psychological significance, but is is simply convenient in indicating certain cases that are associated by little else than a similarity in their cause.

On Insanity caused by Injuries to the Head and Sun-stroke. By FRANCIS SKAE, M.D. (Edinburgh Medical Journal, February, 1866.)

From a careful consideration of a number of cases whose history, symptoms and results are given in this article, and from a review of the record of many more similar cases noted in the books of the Royal Edinburgh Asylum, Dr. Skae concludes that insanity caused by sun-stroke, and insanity resulting from blows on the head or falls, have certain important features in common, and at the same time differ in some essential particulars from insanity resulting from other physical causes. These cases he groups together under the convenient term of traumatic insanity. The following are his conclusions:

1st. That traumatic insanity is generally characterized at its commencement by maniacal excitement, varying in intensity and duration.

2d. That the excitement is succeeded by a chronic condition, often lasting many years, during which the patient is *irritable, suspicious,* and *dangerous* to others.

3d. That in many such cases distinct homicidal impulse exists.

4th. That the characteristic delusions of this form of insanity are those of *pride. self-esteem,* and *suspicion,* melancholia being very rarely present.

5th. That this form of insanity is rarely recovered from, but has a tendency to pass into *dementia,* and to terminate fatally by brain disease.

6th. That the symptoms, progress, and termination of insanity resulting from traumatic causes, are sufficiently distinctive and characteristic to entitle it to be considered a distinct form of insanity.

VARIA.

LOCAL ANÆSTHESIA IN CÆSARIAN SECTION.—Dr. Newman, of Stamford, England, recently performed the operation of Cæsarian section on account of cancerous disease of the os uteri and lower segment of the uterus. Two ether jets from Richardson's spray apparatus were employed, and a space one inch broad and six inches long was rapidly

narcotized. No pain whatever was experienced by the patient, and uterine contractions took place firmly and rapidly. It is evident from the description of the operation that the local anæsthesia was as perfectly successful as any anæsthetic could be; and that, again, as in Dr. Greenhalgh's patient, it caused good uterine contractions, without one untoward or dangerous symptom. The case has progressed most favorably, and, so far as the operation is concerned, Dr. Newman reports the "woman is well."

Dr. Greenhalgh, on the 26th of August, performed again the operation of Cæsarian section, having first produced local anæsthesia by the ether spray. The obstruction to delivery was a large tumor, probably malignant, having its origin in the rectum, and pressing forward upon the vagina to such an extent that it was difficult for the finger to pass to the os uteri. A single large jet from Richardson's apparatus was used in this case, and complete local anæsthesia was induced in fifty seconds. The period from the first application of the ether to complete delivery was three minutes and thirty-five seconds. The woman died on the sixth day after the operation; but, notwithstanding this result, it is clear that the local anæsthesia again proclaimed its many advantages. It completely relieved the pain and so prevented shock; it subdued hemorrhage and induced uterine contraction.

New York Medical Journal Association.—The new rooms of this Association are now open, at 58 Madison Avenue, corner of 27th street, in the Mott Memorial Building. They are well adapted to the requirements of the Association, and it is intended to make them a central point of attraction. The "Reunions," which formed a pleasant feature of medical society last winter, will be resumed during the coming season; and, with the co-operation of the profession, it is believed that the Association will carry out the good ideas upon which it is based.—*Medical Record.*

Out-Door Department of Bellevue Hospital.—The Commissioners of Charities and Correction have organized a new department—in connection with Bellevue Hospital—which is intended to furnish medical and surgical aid to such patients as do not require to be taken in the Hospital. The plan is essentially the same as that so long in operation at our various dispensaries. The lower part of the building occupied by the Bellevue Hospital Medical College has been set apart for this purpose, and furnished with every convenience and appliance which experience has shown necessary to meet the demands of such an institution. The various attending surgeons and physicians

of the Hospital constitute a consulting board for the new department, and by these gentlemen appointments to the position of attending surgeons and physicians for the new department are made. The institution commenced operations on the 1st of October. The following gentlemen compose the attending staff. Diseases of the chest—Drs. T. Delafield and G. H. Humphreys. Digestive organs—Dr. W. S. Ludlum. Nerves—Drs. W. A. Hammond and W. R. Gillete. Male genital organs—Drs. J. W. Southack and G. A. Quinby. Skin—Drs. C. C. Lee and H. G. Piffard. Women—Drs. Lusk and G. S. Winston. Eye and Ear—Dr. C. Corey. Children—Drs. J. B. Done and W. T. Healis. Orthopedic surgery—Dr. Yale. General surgery—Drs. H. R. Moseley, L. Demainville, J. J. P. White, and H. Pinckney.

New York College of Dentistry.—We have received the first announcement of the above College, and are gratified to record the establishment of an institution of so important a character, representing, as it does, a profession closely allied to our own.

It has been a matter of surprise to us that while other cities in our country have their dental colleges, some of which have been in successful operation for more than a quarter of a century, our city, with its abundant and superior resources, had none.

The Faculty of the New York Dental College, as will be found below, embraces the names of many of those most distinguished in their profession.

As the Medical Colleges of the city of New York are acknowledged to be pre-eminent and representative in their character, we trust that the New York College of Dentistry, alike in its location and its resources, will be equally popular and successful.

The College is located on the corner of Fifth avenue and Twenty-second street. The session will open on Monday, November 5th. The Introductory Lecture will be delivered in the evening, at 7½ o'clock, in the Lecture-room, by Prof. Wm. H. Dwinelle.

Faculty—Eleazer Parmly, M.D., D.D.S., Emeritus Professor of the Institutes of Dentistry. William H. Dwinelle, M.D., D.D.S., Professor of Dental Science and Operative Dentistry. Norman W. Kingsley, Professor of Dental Art and Mechanism, and Dean of the Faculty. J. Smith Dodge, Jr., M.D., D.D.S., Professor of Dental Pathology and Therapeutics. Faneuil D. Weisse, M.D., Professor of Descriptive and Comparative Anatomy. Rufus King Browne, M.D, Professor of Experimental Physiology and Microscopy. Charles A. Seely, A.M., Professor of Chemistry and Metallurgy.

New York County Medical Society—At the 61st Anniversary meeting of this Society, holden at the College of Physicians and Surgeons, October 1st, the following officers were elected: President, Dr. S. T. Hubbard; Vice-President, Dr. J. T. Kennedy; Treasurer, Dr. Wm. E. Bibbins; Recording Secretary, Ellsworth Elliott; Corresponding Secretary, H. Mortimer Brush; Censors, Drs. Finnell, Chamberlain, Underhill, Blakeman, and Thomson. Twenty-one Delegates to the State Medical Society, to serve for a period of four years, were also elected. The Society propose to hold a reunion on the 12th of November, at which addresses will be delivered by the President of the Society and others. The President of the State Medical Society and other prominent members of the profession have promised to be present. A collation will be served at the close of the exercises. The hope is expressed that this reunion may be largely attended, as it is not restricted to the members of the Society.

The Jewett Prize.—This prize, of two hundred dollars, to be awarded March 1st, 1867, is offered by Professor Jewett, of Yale College. Subject—"By what hygienic means may the health of armies be best preserved?" The prize is open to competition for all surgeons and physicians of the United States and British Provinces of North America. In the award, the literary merit, as well as the scientific value, of the papers submitted will be taken into consideration. The essays may be forwarded to either of the Committee—accompanied by a sealed envelope containing the name and address of the author. Committee: Dr. B. F. Catlin, West Meriden, Conn.; Drs. L. J. Sandford, and Henry Bronson, New Haven, Conn.

The Astley Cooper Prize.—The ninth triennial prize of three hundred pounds, under the will of the late Sir Astley Cooper, Bart., will be awarded to the author of the best essay or treatise on the disease known as pyæmia. Essays written in the English language, or, if in a foreign language, accompanied by an English translation, must be sent to Guy's Hospital, London, on or before January 1st, 1868, addressed to the Physicians and Surgeons of Guy's Hospital.

The Military Asylum at Milwaukie.—The National Military Asylum to be erected in Milwaukie, Wis., will be located on a tract of about five hundred acres, in an elevated and dry locality. The buildings will consist of three or four separate structures, divided into parlors, reading, sitting, sleeping and bath rooms, and a hospital, besides others requisite for the comfort of the inmates. They will be constructed on a magnificent scale, and will be capable of accommodating

from ten to fifteen thousand inmates. They will be erected at a cost of nearly or quite a million dollars. The asylum will be placed in charge of disabled officers, and will be for the accommodation of all disabled Union officers and soldiers of the late war. Two other similar institutions are to be established in other localities, under the act of Congress.

THE ETIOLOGY OF EPIDEMICS—A PRIZE OF $250 OFFERED.—An anonymous correspondent of the Philadelphia *Medical and Surgical Reporter* offers a prize of the above mentioned amount for the best essay on the Etiology of Epidemics which shall be deemed worthy of such reward—the decision to be made by the writer, associated with the three Professors of Theory and Practice in the three medical colleges of New York city. The editor of the *Reporter* vouches for the genuineness of the offer, and the respectability of the gentleman making the proposal. Essays may be sent to the office of the *Reporter* prior to January, 1868.

NEW MEDICAL JOURNAL.—Dr. Robert Stone, of New Haven, Conn., proposes to publish a journal to be called the European Medical News, which shall consist entirely of translations and selections from the foreign medical journals. The enterprise is deserving of encouragement, for at a moderate price—five dollars per annum—the most valable papers, relating to the science and art of medicine, will thus be accessible to those of our practitioners unacquainted with foreign languages, and those whose means and time do not allow them either to obtain or study the many medical periodicals published abroad. We learn that sufficient encouragement has already been given to warrant the announcement that the publication will soon commence.

Since the beginning of the late rebellion up to May 11th of the present year, the Government has furnished gratuitously to disabled Union soldiers the following number of artificial limbs: Arms, 2,134; legs, 3,784; hands, 144; feet, 9; apparatus for excision, 104. The cost of the same amounted to $357,728.

Brevet Brigadier-General J. M. Cuyler, Surgeon United States Army, is appointed Medical Director of the Military Division of the Atlantic; headquarters at Philadelphia, Pa. Brevet Brigadier-General William J. Sloan, Surgeon United States Army, who has so long held the post of Medical Director of the Department of the East, remains on duty in this city as chief medical officer for New York.

It is with feelings of painful regret that we are called upon to

announce the death of Surgeon B. F. Vanderkieft, late of the U. S. Vols. Dr. Vanderkieft was a native of Holland, and came to this country about the beginning of the late rebellion. Being a man of extraordinary talent, he soon acquired a knowledge of our language, and prompted by pure motives in the cause of science and humanity, he attached himself to the Medical Corps. His marked abilities in his profession soon became known, and he was shortly advanced to a most responsible position, being placed in charge of field hospitals, where he gave such evidences of skill in his profession and sound judgment in his management, as to gather around him hosts of admirers among officers of the army, and life-long, grateful friends among those who came under his care. From the field he was ordered to Annapolis, and was placed in charge of the hospitals at that point, and at one time had under his charge fifteen thousand sick and wounded men. Subsequently he was in command of one of the General Hospitals in Baltimore. While here he had the misfortune to lose his wife. The blow was a severe one, and a settled melancholy followed, from which he never fairly recovered. At the close of the rebellion Dr. Vanderkieft formed a business connection with the Messrs. Fougera, druggists and pharmaceutists, of this city. This active occupation seemed more congenial to his tastes than the confinements of professional life; but his health, already weakened by the exhausting effects of long continued disease that had been contracted in the service, was not equal to the self-imposed task. He died on the 9th of August, in Rochester, New York, at the house of an intimate friend (Dr. W. W. Ely), where he had gone for the purpose of making a brief visit.

Death of Dr. Gould.—Dr. Augustus A. Gould died of cholera, in Boston, on the 15th of September. He was in his usual health up to within a few hours of his death. Dr. Gould was born in New Ipswich, N. H., April 23, 1805, and graduated at Harvard College in 1825. He pursued the study of medicine with Drs. James Jackson and Walter Channing, and immediately thereafter commenced practice in Boston. Dr. Gould was widely known as a scientific student and writer. Science was the leading passion of his life. He was appointed by Congress, in 1846, to classify the shells collected by the Wilkes Exploring Expedition, and contributed a quarto volume to the history of that national enterprise. He was associated with Prof. Agassiz in the preparation and publication of his earlier works, and was largely instrumental in inducing that distinguished professor to make his home in the United States. He was one of the leading members of the Boston Society of Natural History; was a Fellow of

the American Academy of Arts and Sciences; of the American Philosophical Society; of the American National Society of Science; and, two years ago, was unanimously elected President of the Massachusetts Medical Society. He contributed voluminously to the published transactions of these distinguished bodies. In 1862 he published his *Otea Conchologica; Descriptions of Shells and Mollusks, from* 1839 *to* 1862. In the department of vital statistics he stood eminent among American students of that neglected science. He contributed, with a few exceptions, to every volume of the annual reports of the Registrar-General of Massachusetts, and these articles have a value only fully recognized by the laborious workers in the same field. In addition to these writings, Dr. Gould furnished important papers to various European and American scientific societies of which he was an honorary member, and to different home and foreign publications. He was engaged for several months before his death on a report of the Invertebrata of Massachusetts, a work first published in 1841, and for a new issue of which the Legislature of 1865 made an appropriation of $4,000. This work was nearly completed. He was engaged on it the day previous to his death.

Death of MM. Chaussier and Gibert.—Dr. Chaussier, a son of the illustrious Professor Chaussier, and Dr. Gibert, the eminent dermatologist, of the Hôpital San Luis, have both died recently in Paris, of cholera. M. Gibert had always ridiculed the premonitory diarrhœa of cholera as a fanciful idea, and although suffering from it for some days before his death, persistently refused to take any measures for his relief.

Dr. John Dawson, for many years Professor of Anatomy in the Sterling Medical College of Columbus, Ohio, died, in that city, on the 4th of September.

The Prospectus of a new Journal, to be published at Kansas City, under the title of the Kansas City Medical and Surgical Pioneer, is received. It is to be monthly, of some forty or fifty pages. Dr. J. Keller is announced as the senior editor.

Thoroughly Disinfected.—Dr. Charles Brockhausen, assistant physician at the City Hospital, St. Louis, Mo., having finished his rounds through the hospital wards one day recently, was about to proceed to the cholera tents, but before doing so concluded to take a glass of what he termed metaphorically "disinfectant," but what in the vulgar is known as brandy. There happened to be on his shelf two demijohns, very similar in appearance, one of which contained brandy, while in the other was a disinfectant known as chloride of zinc. The

doctor hastily mixed him a potation and swallowed it at a draught. His sensations after taking it were peculiar. He perceived at once that he had taken his disinfectant out of the wrong bottle. He communicated without loss of time with two brother Esculapians, who, by the timely administration of antidotes, neutralized the action of the poison and saved his life. Dr. Brockhausen has no fear of catching the cholera for some time to come. He deems himself thoroughly disinfected.

Women as Physicians.—The following extracts from a letter of of Prof. H. R. Storer to the Directors of the New England Hospital for Women will be read with interest, bearing, as they do, upon a question which has been freely agitated within the past few years. As Dr. Storer's views herein stated are the result of long continued observation and experiment, they are entitled to vastly greater consideration than any purely abstract or theoretical ideas—which, by-the-way, in this question would very likely by biased by philanthropic motives, or a mistaken sentimentality in the striving to reach the point of "the real enfranchisement of women"—can possibly lay claim to. The other portions of Dr. Storer's letter contains views on the management of the hospital above referred to, but which are applicable in a general way to many other of our public charitable institutions, and worthy of serious thought. We have not the space to quote them here; but those of our readers who are curious to learn them will find the whole letter in the *Boston Medical and Surgical Journal* of September 27th:

Having received my resignation, you may consider as gratuitous the remarks I am now to make, and may wish that they had been withheld. The connection that has existed between us has, however, been a public one. It has been severed by your own action, and the changed relation will become a matter of public comment. It is not improper, therefore, for me to say one word more.

Before accepting your appointment, I had for many years felt the need of a public hospital for invalid women; a need that still exists, for with all your large endowments and the promises that have been made to the community, your hospital is not in the proper sense a charity. It was chiefly the expectation that it would be made such that induced me, some three years ago, by identifying myself with it, to act contrary to the advice of many of my most respected professional friends, such gentlemen, for instance, as Drs. James Jackson, Jacob Bigelow, J. Mason Warren, and others of a similar standing. As a mere aid to establish any individual reputations, or a means of compelling the success of a measure that was obnoxious to physicians generally, I should not have given the hospital my countenance. That I have since discovered it to possess both these features, I can-

not deny. Having connected myself with it, I was willing that incidentally, and only incidentally to the great end of affording a charity hospital for the diseases of women, the experiment of testing the ability of women to become fitted to practice as general physicians should continue to be tried. My position upon this question, as you may know, has been one of perfectly good faith. I have withstood alike entreaties, overtures, threats, from those who disapproved of my course; for, on the one hand, I have desired to do what little I personally could towards the real enfranchisement of women, provided this were a means to such end; and, on the other, I have thought that by elevating the few women who might be better educated than the mass of those of their sex assuming medical honors and responsibilities and masculine appellations, our profession might be purged, to a certain extent at least, of many claimants utterly unfitted for its membership. Under these circumstances, I shall probably be allowed, both by those indorsing and those regretting my late position, to have had good opportunities for judging as to these questions.

Since receiving your communication, I have been better able than before to dispassionately consider and weigh the whole matter. You yourselves have freed me from the bonds that otherwise might have restrained me, at least from expressing, if not from forming, an unbiased opinion. It is sufficient for me to say, that despite certain exceptional cases upon which so much stress has been laid, exceptions in every sense of the word, I think that the experiment has been a failure; and that were there no other reason than for a physiological one, perfectly patent, though its importance has been so much lost sight of, women can never, as a class, become so competent, safe and reliable medical practitioners as men, no matter what their zeal or opportunities for pupilage.

For certain of the professional ladies whom I have met, I have personally the highest respect and esteem. Miss Z——, the beauty and purity of whose life, as already published to the world, I have long seen verified, may well challenge comparison in practice with a certain percentage of my own sex; Miss T——, now for two years my assistant in private practice, has such natural tastes and inclinations as fit her, more than I should have supposed any woman could have become fitted, for the anxieties, the nervous strain and shocks of the practice of surgery; and there are others not now officially connected with the hospital, whose names I would mention in terms of similar commendation. Such are, however, at the best, but very exceptional cases, and I am driven back to my old belief, the same that is entertained by the mass of mankind, that in claiming this especial work of medicine, women have mistaken their calling; a belief that, contrary to assumptions that have been made by certain interested parties, I have found to be generally held by ladies of true refinement and delicacy, and by the majority of female patients, no matter what their station in life.

I make these statements deliberately, for they are of public interest. I make them with regret, for to some they will give pain. You yourselves have placed me where I could view the matter in a truer

light than might otherwise have been possible. Many things have hitherto conspired to warp my judgment; the opposition and violent denunciations of former associates, the knowledge that to my own personal exertions has been owing much of your pecuniary success, and to my own professional reputation, whatever this may be, very many of the applicants for medical and surgical aid, and above all, my habit of never abandoning an experiment until it has been tried to my full satisfaction. The attainment of that point you have now assisted me in recognizing; and in yielding to the irresistible logic of facts, I thank you all for the many marks of confidence I have up to this moment received at your hands.

Errata.—In Dr. Dyer's article, September No., page 418, 16th line from the top, insert, after "corneæ a little dull," *and moist from mucus.* On page 419, line 28, for "films of the iris" read *fibres of the iris.* On page 420, line 19, for "Dr. W. W. Kern" read *W. W. Keen.*

BOOKS AND JOURNALS RECEIVED.

A Treatise on the Origin, Nature, Prevention and Treatment of Asiatic Cholera. By John C. Peters, M.D. New York: D. Van Nostrand, 192 Broadway. 1866. 8vo, pp. 162.

Manual of Materia Medica and Therapeutics. Being an abridgment of the late Dr. Pereira's Elements of Materia Medica. By Frederick J. Farre, M.D., Cantab., F.L.S. Assisted by Robert Bentley, M.R.C.S., F.L.S., etc., and by Robert Warrington, F.R.S., F.C.S., etc. Edited by Horatio C. Wood, Jr., M.D., Prof. of Botany, Auxiliary Faculty of Medicine of the University of Pennsylvania, etc. Phila.: Henry C. Lea. 1866. 8vo, pp. 1030.

A Manual of Medical Jurisprudence. By Alfred Swaine Taylor, M.D., F.R.S., Fellow of the Royal College of Physicians, Prof. of Medical Jurisprudence and Chemistry in Guy's Hospital. Eighth edition. London: John Chapman & Sons. Philadelphia: J. B. Lippincott & Co. 1866. 12mo, pp. 707. (From the American publishers.)

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DECEMBER, 1866.

ORIGINAL COMMUNICATIONS.

Epidemic Cholera in Brooklyn, New York. By WM. HENRY THAYER, M.D., Physician to the Hamilton Avenue Cholera Hospital, Brooklyn.

The epidemic cholera of 1866 first appeared in Brooklyn on the 7th of July, in Wolcott Street, in the 12th Ward. The case was fatal. Other cases occurred within four days from this time in the 3d, 4th, 6th, 9th, 12th, 17th and 19th Wards, points widely distant from each other. The disease steadily increased, chiefly in the 12th Ward; and on the 22d of July a hospital was opened, by order of the Metropolitan Board of Health, in Hamilton Avenue, on the corner of Van Brunt street, on the boundary of the 12th and 6th Wards, which was put into my charge on the 25th of July.

The building is a large brick structure of two stories and a basement, having two sides open to the streets, with numerous windows. The first floor was used for the hospital ward; it consisted of one large room, about 110 by 70 feet; a portion was curtained off for females, and ventilation was not obstructed. The doors and windows were kept always open.

The adjoining building was used as a house of refuge for

families removed on account of being attacked with cholera; and a number of families, especially of children, were taken in temporarily in the course of the season.

One hundred and twelve patients were received in the hospital up to the 6th September, when it was closed. Of these, eighty-four were cases of cholera, and twenty-eight of cholera morbus, dysentery, diarrhœa and cholera infantum.

Of the eighty-four cases of cholera there

Entered	in	1st	stage, 13;	of whom	12	recovered;	1	died.
	"	2d	57;	"	7	"	50	"
	"	3d	14;	"	7	"	7	"

Of the twenty-eight cases of other diseases, twenty-five recovered and three died; the fatal cases were of cholera infantum, the children of parents dead of cholera.

Patients who recovered, passed, with few exceptions, through all the stages. Fatal cases terminated chiefly in the second stage, the stage of collapse; of the fifty who entered in collapse and died, forty-three died in that stage, and seven in the third stage.

The three stages have very marked distinctions.

The first stage is characterized by profuse purging and vomiting of a light straw-colored, pearly or grayish fluid, with more or less of flocculent sediment, without fecal odor and without abdominal pain or effort, and accompanied with cramps in the legs. The diarrhœa usually precedes the vomiting by several hours; sometimes from a day to a week; but it is doubtful whether in diarrhœa of several days' continuance the evacuations are of the peculiar choleraic character.

The second stage is the algid stage, the stage of collapse; the first indications of failure of the circulation mark its commencement. It supervenes almost immediately on the appearance of cramps, and very soon after the commencement of vomiting. The circulation in the extremities diminishes rapidly; the radial pulse loses strength, while the pulsations of the heart become more frequent; the soft parts shrink, the secretions generally are arrested, although the skin is bathed with profuse sweat. The purging, vomiting and cramps continue; there is extreme and incessant thirst, and frequently great restlessness.

The progress of collapse is rapid, a few hours making a complete transformation in the appearance of the patient. Respiration grows labored and frequent, and the voice husky and feeble. The pulse becomes extinct at the wrist; the skin grows extremely cold and livid, sometimes over the entire surface; the soft parts lose their elasticity and feel like putty; the skin of the hands and sometimes of the feet is deeply corrugated, and when pinched up remains so; the face is so much shrunken and the eyes so deeply sunken, as often to prevent the recognition of a patient after a few hours' sickness; the conjunctivæ are deeply injected, the voice is reduced to a whisper, the tongue and breath are cold.

Vomiting, purging and cramps cease several hours before death, and a degree of stupor generally supervenes.

When patients survive the stage of collapse, they pass into a third stage, which is characterized by reaction and a febrile movement.

The passage from the second to the third stage is commonly gradual. It is only on the second or third day after the circulation begins to resume its normal condition, that secretions are fully restored, and the last evidences of congestions disappear, the skin losing its lividity, and recovering its elasticity, and the injection of the eyes disappearing. Fever of typhoidal character succeeds, characterized by heat of skin, accelerated and feeble pulse, dry and crusted tongue, diarrhœa, and sometimes delirium. If death occurs in this stage the diarrhœa usually continues to the last, the dejections often becoming involuntary, and delirium is sometimes replaced by coma.

In this stage there is a liability to complications, especially of local inflammations—dysentery, pneumonia, parotitis, abscess and urticaria.

This division is a natural one; the stages are very distinct in their character, and mark material changes in the general condition, in the indications for treatment, and in the prognosis. The term *collapse* describes the whole of the second stage; no definite line of separation can be drawn between partial and complete collapse; the onset of the algid symptoms marks its commencement, and its progress is rapid and constant until death.

The first stage, if reckoned from the beginning of vomiting, is usually very short, a few hours only elapsing before the development of algid symptoms, which sometimes, indeed, begin to appear almost immediately after the vomiting. The stage of collapse is commonly longer, but is proportioned to the length of the first, coming to a fatal termination earlier where the first stage has been short. The third stage exceeds in length the aggregate of the first and second, extending to several days or a week, and, when attended with serious complications, it may run to a much longer period.

It is often impossible to ascertain definitely the previous history of patients admitted to hospital, but the following statement of the duration of cholera, in fifty-two cases, is considered reliable.

Average length of cases fatal in second stage, thirty-one hours; the shortest case was eight hours, the longest, seventy-five hours.

Average length of cases fatal in third stage, nine days; the shortest was five days, the longest, twenty days.

Average length of cases that recovered in third stage, seven days; the shortest was four days, the longest, eleven days.

The symptoms demand special notice.

In the cases of cholera treated at the hospital, *diarrhœa* was ascertained to have preceded vomiting in twenty-seven cases, a length of time varying from six hours to two weeks; or, casting out three cases in which it lasted respectively one, two and two weeks, the average of twenty-four cases was thirty-two hours. In most of the remaining cases it was pretty well ascertained that the commencement of diarrhœa and vomiting was nearly simultaneous. In a few cases vomiting was the prior symptom.

The dejections after admission were almost invariably of "rice-water" character, already described, but in several cases had considerable color, green or brown. The amount varied much, was generally very great, but in some moderate, and not at all proportioned to the severity of the disease—frequently those most early fatal having only moderate evacuations. One patient had several dejections, consisting of the flocculent matter alone, the epithelial debris, to the amount of two ounces

at once. In one or two cases some of the discharges contained blood; several reported their early dejections bloody, and one who died in collapse had three or four dejections of blood and mucus in the last twelve hours of life.

Diarrhœa ceased several hours before death in all cases which were fatal in the second stage. It continued through the third stage until convalescence, although the dejections presented a totally different character, becoming brownish and feculent. In some cases it was severe and intractable in the third stage, and appeared to be the immediate cause of death.

Vomiting began generally soon after the diarrhœa, or simultaneously with it. The matter vomited was similar in character to the dejections, but often more watery, from the amount of fluid drunk. Free drinking was always followed by increased vomiting. Some in the second stage vomited every few minutes, although drinking only half an ounce or an ounce of water at once; others retained what was swallowed for several hours, and then vomited it, perhaps to the amount of two quarts at once. Vomiting was usually performed without warning or effort, but in a very few cases it was followed by retching.

In some patients who survived the second stage, vomiting continued several days, resisting every mode of treatment, except the total withholding of food and drink by the mouth, and the substitution of nutritive enemata. Several patients vomited worms in the third stage. The persistent vomiting in the third stage was due sometimes to complications, such as pleurisy or pregnancy, but sometimes was dependent on a continuance of the congestion of the stomach from the first stage.

Cramps usually commenced with the vomiting, generally in the legs, sometimes also in the feet and hands. In some cases they were frequent and very severe, but not in the greater number; in some they were very slight, causing hardly any complaint. Neither cramps, vomiting nor purging were usually commensurate with the virulence of the disease, some of the most rapidly fatal cases having limited discharges and hardly any cramps.

The circulation began to exhibit serious changes after a short continuance of the vomiting and purging. The extremi-

ties first became cold and livid, the general surface began to shrink, and the shrinking rapidly increased, the face and extremities exhibiting the most marked changes, the eyes becoming deeply sunken (with intense injection of the conjunctiva), the cheeks falling away in a few hours to the appearance of the last stage of typhoid fever, with deep lividity superadded; the fingers becoming deeply corrugated, the tongue and breath cold. In a few fatal cases, however, there was little shrinking or lividity; in nearly all, the lividity and coldness extended to all the extremities before death, and in some cases the lividity was universal. Simultaneously with the first appearance of a lowered temperature of the skin, the pulse grew small and weak, failed continually, and in most cases became extinct in the extremities several hours before death. In some fatal cases, however, even where there was great lividity, the pulse could be felt to the last. The radial pulse was extinct in twelve patients on admission, of whom one recovered. It was hardly perceptible, on admission, in fifteen, of whom one recovered. It was intermittent in several cases in the third stage.

The heart's action was always accelerated in the second stage, ranging from 102 to 148.

In passing from the second to the third stage the circulation gradually recovered its normal character, the lividity disappearing in two or three days.

Respiration was nearly always more or less hurried and labored in the second stage.

The voice was always feeble and husky after the commencement of the second stage, and sometimes became reduced to a whisper. Several patients were entirely speechless on admission, but recovered a faint voice and articulation after an interval.

The urine was nearly always suppressed in the second stage —only two patients reported having passed urine once in this stage, and the secretion did not continue. It usually reappeared in the third stage within 36 to 72 hours from the commencement of reaction. There was no uric odor in any.

Sweating was profuse in only a few cases; but the skin had always an unnatural moisture in the second stage.

The appetite was entirely absent until the third stage, when liquid nourishment was almost invariably taken willingly.

Thirst was marked in all, in some extreme, and caused their chief suffering—the patient calling incessantly for water or ice, although vomiting it the next minute. It continued unabated through the second stage, and disappeared with the establishment of the third.

Oppression or pain at the epigastrium was a not uncommon symptom during the second stage.

Headache was an occasional symptom.

The *tongue* was almost invariably clean and moist, and in the second stage its temperature was less than normal—as collapse advanced becoming very cold. The mucous membrane of the mouth was noticed in some cases, and found to be equally cold with the tongue. With the coming on of the third stage the tongue became dry, warm and coated.

Delirium was present in slight degree in several cases during the second stage, but in nearly all the mind was undisturbed. It was present in the third stage in eleven of those who died, and in one who recovered.

Coma preceded death in the third stage in five cases.

Wakefulness was the prevailing condition during the second stage—only a few slept.

Restlessness was very common, the patients tossing about, throwing off the blankets and turning from side to side. A few only were perfectly quiet. Some complained of burning heat, although the skin was cold as marble, and several in the stage of collapse got out of bed and lay on the floor whenever the attendant left the bedside.

Convulsions occurred in one case, on the first day of the third stage, in the course of a somewhat stupid condition, and before any urine had been passed. The patient was a girl, seven years old, and ultimately recovered.

The *muscular strength* was often considerable to the last in the stage of collapse. One patient, a woman, walked to the hospital alone, a distance of two blocks, although far advanced in the stage of collapse and pulseless. A boy, who was extremely thirsty, sprang out of bed a few minutes before he died, some time after the circulation had ceased in his extrem-

ities, and hurried across the ward to the water-cooler. Several similar instances occurred.

Some complications were noticed.

Parotitis occurred in the third stage in two patients, resulting in profuse suppuration in one case, in which it appeared to be the immediate cause of death. In the other case there was no suppuration.

Abscess in the cheek appeared in the third stage in another case.

Dysentery followed the first stage of cholera in one case. This patient had had a mild attack of cholera a few days previously, and recovered.

Pleuro-pneumonia was found after death in one case, in which it had been latent. In the same case there was commencing granular nephritis.

Parturition complicated one case, and took place in the third stage, the patient being in the seventh month of pregnancy. She died three days after.

The arrangement of the hospital gave no opportunity for autopsies; but towards the close of the season three subjects were examined elsewhere, one who died in the second stage and two in the third.

The principal points noticeable in the second stage were, congestion of the mucous membrane of the alimentary canal irregularly throughout, fluidity and dark color of the blood, contraction of the heart, collapse of the lungs, fullness of the gall bladder and emptiness of the urinary bladder. Congestion of the stomach was found in the other two cases, in both of which vomiting had been a troublesome symptom in the third stage.

The following conclusions in regard to treatment are derived from the hospital experience.

Absolute repose is indispensable.

In the first and second stages all nourishment is hurtful.

During these stages an unlimited allowance of water is objectionable, the effect being to increase the vomiting and not to relieve the thirst. Small bits of ice or spoonfuls of water, repeated every five or ten minutes, are the most grateful, and do not increase the vomiting.

Stimulants are useless during the stage of collapse; they are not absorbed, and only aggravate the vomiting. They are not more effectual in this stage when given by the rectum. Patients sometimes ask for wine or brandy, and a small quantity given at considerable intervals may do no harm.

External heat rarely has any influence in restoring the warmth of the surface during the cold stage. It is useful in assisting the returning warmth when the second stage is passing into the third.

Friction has no effect in restoring warmth, and interferes with the repose which is most favorable to the case.

Sinapisms are useful in relieving cramps or abdominal pain, and in exciting the circulation in the extremities.

Upon the reaction from collapse nourishment becomes necessary, and should be given in concentrated liquid form, in small quantities, frequently repeated. Strong beef tea is the best diet at this stage, and if objected to or not retained, may be replaced by rennet whey, milk and lime water, gruel or tea.

Stimulants are also required, in quantity according to the case—brandy, whisky, wine, milk-punch or eggnog.

In case of the continuance of gastric irritability into the third stage, so that food cannot be retained, it may be given by the rectum. A sufficient amount of beef juice, with the addition of brandy, if necessary, may be given by enema, to meet the wants of the system.

Convalescence is marked by the abatement of febrile action —a return of appetite and improvement of the secretions— and indicates a fuller diet and the return to solid food, after which recovery is rapid.

The success of active treatment in cholera depends very much on the promptness with which it is undertaken. It is only for a brief period that the system is very susceptible to the influence of medicines; cholera, left to itself, has a fatal tendency; the second stage is soon established, the collapse deepens rapidly, and treatment soon becomes unavailing.

In the first stage the disease is amenable to treatment, and such remedies as arrest the discharges or excite a new action in the portal circulation afford good results, while in advanced collapse all medicines are wholly inert.

Of the cases in the hospital, a large proportion were too far advanced at entrance to give the slightest encouragement of success in treatment, and in some cases no medication was used.

During the first two weeks of the hospital, a variety of treatment was adopted, including "Squibb's mixture" of camphor, chloroform and opium, brandy and capsicum, camphor and chloroform, mineral acids, and acetate of lead, with friction and external heat. After this time, patients in the first or second stage were put upon calomel alone.

Of the thirteen patients admitted in the first stage, twelve were treated exclusively with calomel, and recovered; no calomel was used in the remaining case, which was fatal in six days.

Of fifty-seven admitted in the second stage, twenty-three were treated with calomel, of whom six recovered, three exhibited partial reaction, and four passed out of collapse and died in the third stage.

Calomel was also used in three cases admitted in the commencement of the third stage, in whom the choleraic discharges still continued.

Only one patient recovered, of those admitted in the first or second stage, who was not treated with calomel.

It was used in various doses, from one to ten grains; if in small doses, continued every hour, till there was some appearance of improvement or the approach of death; if in five or ten grain doses, it was repeated every hour, till thirty or forty grains had been taken. The method preferred was the use of the largest doses for three or four hours.

The immediate effect was commonly the arrest of the discharges; and where improvement took place, it was usually manifested in about twelve hours, by the commencement of dark brown or green stools, with sensible relief of epigastric disturbance and thirst, and returning warmth. Reaction was generally gradual, but in two cases it was sudden and rapid.

Diarrhœa in the third stage was not more severe in the cases thus treated than in those where no calomel was used, and it was quite as troublesome in those who had been treated with one grain doses as in those who had ten grains. It was

very troublesome in one fatal case, that passed through all the stages entirely without medication, except alcoholic stimulants.

Only five patients had mercurial stomatitis, and those only in very mild degree, and without salivation.

It is unnecessary to dwell long upon the results of other remedies used, since the experience of them was very limited; they were abandoned in favor of calomel. Camphor was given in several cases in five grain doses, dissolved in chloroform, repeated four or five times an hour, without effect. Acetate of lead was several times used, sometimes with temporary relief of the vomiting and purging, but with no sensible effect on the essential character of the disease. Brandy gave no relief. Capsicum only increased the epigastric uneasiness. "Squibb's mixture" was used a number of times, and sometimes with temporary advantage. Opium was never used except in this mixture, or with acetate of lead. Ten patients had no remedy whatever.

The third stage demands nourishment, stimulants and tonics. Diarrhœa was treated with vegetable astringents, or the tincture of sesquichloride of iron, or sometimes with opiate enemata. When there was a marked typhoidal condition, and delirium was present, sulphate of quinia was used with good effect.

The loss of serum cannot be regarded as the main pathological element of cholera. Other changes in the blood are unquestionably the most important. The amount of serum lost does not exceed what is frequently lost in cases of cholera morbus, without producing collapse, or having a fatal tendency. The germs of cholera produce far more serious effects on the blood; they disorganize the red corpuscles, and destroy their power of oxygenation. Although Donné did not find the corpuscles altered, Magendie, Chevalier and others have found them so, and it is well known that they undergo decomposition rapidly after death. The blood is invariably deeply carbonized after the formation of the second stage, and on exposure to the air is very slow to absorb oxygen. The air expired by the lungs contains no trace of carbonic acid, and has an excess of oxygen. Failure of the systemic circulation

might explain the accumulation of carbonic acid in the blood, but its slow oxygenation, when exposed to the air, would seem to indicate an abnormal condition of the red corpuscles. When the blood is restored by fluid injections into the veins to a degree of fluidity which enables the circulation to be resumed, the results which follow are only temporary; the algid condition subsides, but after a short interval the circulation again declines, even without further loss of fluid by the alimentary canal, and death follows. It is also noticeable that the most malignant cases of cholera are not those in which the greatest amount of fluid is lost by vomiting and purging. All the phenomena indicate that there are alterations in the blood more serious than the loss of fluid.

Whatever course of treatment is to be beneficial after the disease is fairly established, must be the use of remedies which have an influence beyond checking the discharges; they must have the power of arresting the multiplication of germs of cholera within the body. Such remedies act primarily on the alimentary mucous membrane, and their extended influence may be partly by direct absorption and partly by nervous agency; their *modus operandi* certainly has not been determined, but modern pathology teaches that neither the circulatory nor the nervous system can be regarded as the exclusive seat of zymotic disease, and it is desirable to lay aside all hypothetical interpretations of the pathology of cholera.

The following typical cases, taken from the hospital records, are all that my limited space will allow.

Case I.—*Entered in first stage. Recovered.* John Forsyth, æt. 45, Ireland. Aug. 15. Entered hospital at 9 P.M. Has had a painless diarrhœa for a week. Worked in the rain this morning, and continued wet through the day. Had great increase of diarrhœa since 2 A.M. This evening had watery vomiting, and since 7 P.M. occasional cramps in legs.

On admission, pulse feeble, feet somewhat cold, skin elsewhere about natural, tongue warm, slightly coated. Vomiting and purging continue, of "rice-water" character. An hour after entrance had very violent cramps in legs. *Got* ℨj. *of "Squibb's mixture." Sinapisms to legs.* At 12 at night and 1 A.M. got *hydrarg. chloridi mitis, grains* x. each time. Cramps

continued violently until 2 A.M., after which they were less severe. Had three "rice-water" evacuations in latter part of night.

Was much better on 16th. Passed urine in forenoon for the first time since admission. In afternoon was put upon beef tea and milk-punch every hour alternately. In night of 16th had three brownish fecal fluid dejections, without cramps. On 17th, one dejection, nearly natural. Was discharged, well, August 23d.

CASE II.—*Entered in second stage. Recovered.* July 30. Ann Bivin, æt. 6½. Entered at 9 P.M. Was brought to hospital in her mother's arms. Taken sick at 8 A.M., vomiting and purging a colorless fluid. Her mother has been away all day, and does not know whether she has had cramps. At entrance, skin cool, much shrunken and livid, eyes sunken and deeply injected, pulse very feeble, pain in epigastrium, thirst. Vomited and purged soon after entrance a small quantity of nearly colorless flocculent fluid. *Got sinapisms to abdomen and legs,* "*Squibb's mixture,*" ʒss. Vomited very soon. At 9½ P.M. *got plumbi acetatis,* gr. ij., *opii,* gr. ⅜, *m.* At 10½ P.M. *got brandy,* ℥ss, which was continued every half hour through the night. Had water frequently. Vomited once or twice.

July 31, 6 A.M. Lower extremities cold, otherwise warm. Pulse stronger. Has been very restless all night. *Got coffee,* ℥iv. 7 A.M., colder and pulse weaker. *Got tinct. opii,* mx., *tinct. camphoræ,* mxij., *m.* Vomited, in fifteen minutes, considerable watery fluid. 7½ A.M., *repeated plumbi acetatis et opium, applied hot bottles to legs, continued brandy.* 11 A.M., skin warm; pulse stronger, 180; sleeps; drowsy when roused. *Continue brandy every hour, beef tea.* Continued drowsy through day. Vomited twice. Heat of skin gradually abated; pulse fell from 180 to 150 before night; eyes grew less injected. Took beef tea through day, but at night refused it. At 8 P.M. had convulsions of face and hands for five minutes.

Aug. 1. Better. No urine since entrance. Slept through night, but sensible when roused. Brandy was continued through night. No dejection. Tongue moist, very slightly coated. Pulse 132. Skin temperate, not unnaturally dry. Disinclined

to take beef tea or brandy. 9 A.M., *got enema of beef juice*, ℥j., *tinct. opii*, gtt. x., *m.* 2 P.M., *enema of beef juice*, ℥ij. ℞. *Spiritûs ætheris nitrici*, ʒss. 5 P.M., passed a quantity of urine, first time since entrance.

Aug. 2. Continues beef juice by enema. Has tried whey and other liquids, but is tired of them. Passed urine twice in night.

Aug. 3. Left parotid began to swell yesterday afternoon.

Swelling of parotid increased till 5th; began to abate on 6th, without suppuration. Patient began to take solid food on the 5th, and convalescence proceeded without any drawback.

Aug. 7th. Swelling nearly subsided. Discharged.

This patient was the only one of those admitted in the first or second stage who recovered without the use of calomel.

CASE III.—*Entered in second stage. Died.* Hannah Appleyard, æt. 19. Aug. 30. Admitted at 11 A.M. Was taken with vomiting and purging of "rice-water" between 5 and 6 A.M. Has been costive for two days. This patient, with two others brought to hospital, has been watching for two days with a cholera patient in a close room.

At entrance, skin cold, livid, moist; fingers corrugated; pulse extremely feeble; tongue cold, moist, clean; eyes sunken, somewhat injected; voice hardly audible; respiration somewhat labored, not rapid, expiration forcible; thirsty; not very restless; sleepy, with an appearance of extreme exhaustion; cramps beginning now, not severe. *Got hot bottles to feet; hydrarg. chloridi mitis*, gr. x., *three times, at intervals of an hour.*

1 P.M. Has sunk very much; nearly pulseless. Two dejections, one quite large, of nearly colorless water, with small amount of flocculent matter. No urine.

Had occasional slight cramps in legs and some in hands through afternoon. Lay almost without motion, and sleeping much. No more vomiting nor purging. Lividity deepened constantly. Died at 7 P.M.

CASE IV.—*Entered in second stage. Died.* John Brown, æt. 39. Aug. 23. Entered at 6 P.M. Taken with "rice-water" vomiting and purging at 1 A.M., and cramps an hour

afterward. Collapse at 3½ P.M. Reports got through day *hydrarg. chlor. mitis*, gr. ix., in three doses.

At entrance, skin livid, moist, cold and shrunken; fingers corrugated; eyes sunken, injected; no urine since attack; no cramps for several hours. *Got hydrarg. chlor. mitis*, gr. x., at 6½ and 7½ P.M. Four small, reddish, bloody dejections in first hour after admission, without tenesmus. Oppression at epigastrium. No vomiting after entrance. Sank steadily, and died at 2 A.M., August 24th. Had one large watery dejection shortly before death.

Autopsy 14 hours after death, by Dr. P. L. Schenck, Assistant Physician of the Hospital. Rigor mortis well marked. Body of purplish hue. Heart contracted, dark colored and slightly softened; valves normal; some points of injection on outer surface; parietal pericardium thin and dry. Small straw-colored clot and some dark coagula in right auricle and ventricle; blood everywhere else in body dark and fluid.

Lungs collapsed, crepitate throughout; present, dark red surface on section; emphysema of lower border of left lower lobe.

Liver rather small, much softened, of dark bronze color; lower surface dark green, almost black; lobules distinct. Gall bladder distended with greenish black bile, less viscid than natural.

Spleen normal; some old peritoneal adhesions of spleen and liver.

Stomach has red patches and points of injection of the mucous membrane, with softening in the vicinity, along lesser curvature; otherwise normal. Mucous membrane of intestines covered with viscid mucus; in small intestine, portions slate-colored, others red; Peyer's patches normal; large intestine slate-colored throughout, mixed with red in points and patches; redness most marked in cæcum. Kidneys normal. Bladder empty and contracted. Brain not examined.

CASE V.—*Entered in second stage. Recovered.* August 5. Edward Cusack, æt. 36. Taken sick at 11 P.M., August 4th, with vomiting, purging and cramps. Entered at 8.45 A.M., in collapse. Has had no physician. Has been drinking hard; was at a wake night before last, and yesterday at a funeral, drinking much liquor.

9 A.M. Skin cold, with slight lividity; eyes sunken, injected, with deeply livid areolæ; pulse of fair strength; tongue moist, œdematous, cool, with light coat; very thirsty; oppression at epigastrium; respiration labored. ℞. *Hydrarg. chlor. mitis*, gr. x., *every hour*.

10 P.M. Vomited immediately after second dose of calomel. Got four doses. Vomited several times; some cramps. Skin now colder, and lividity has much increased; pulse weaker; is very restless and thirsty; complains very much of uneasiness at stomach. ℞. *Hydrarg. chlor. mitis*, gr. xv.

August 6. 9 A.M. Had four small, brownish, liquid dejections about midnight. Says sense of oppression at stomach was removed at that time. Slept well since. Is now quiet; thirst relieved; skin warm; respiration quiet; no vomiting; no urine. *Beef tea*, ℥ij., *every two hours*. 9 P.M., vomited freely; dislikes beef tea. ℞. *Tinctura opii*, gtt. xxv.

August 7. Better. Up and dressed, wishing to go home. *Bread, butter and coffee.*

August 8. Two copious fluid fecal dejections yesterday forenoon, and got an astringent mixture at noon. No dejections nor vomiting since. Feels very well. Left, without leave, this day.

CASE VI.—*Entered in second stage. Recovered.* August 10. Paulina Geiss, æt. 10. Entered at 11 P.M., in collapse. On admission, universally livid, with cold extremities; no pulse at wrist; eyes very much sunken and dejected; aphonia. Has been vomiting and purging, with discharges of "rice water." ℞. *Hydrarg. chlor. mitis*, gr. v., *three times*.

August 11. Passed a restless night. Vomited once. No dejection. Pulse just perceptible; skin cool; lividity same. *Repeat medicine once.*

August 12. Two whitish, watery dejections yesterday. Became a little warmer in evening. Medicine was repeated in evening. One yellowish dejection in night. Pulse still very weak; skin cool and livid; tongue clean; no urine; has been drowsy since entrance. ℞. *Hydrarg. chlor. mitis*, gr. iij.

August 13. One dejection last evening, of good color and some consistency; slept well; tongue clean; pulse good strength; less lividity. ℞. *Syrupi rhei aromat.*, ʒij.

From 13th to 17th, being averse to eating, was supported by enemata of beef juice, ℥ijss., every four hours, which were well retained. The eyes recovered their natural appearance on the 15th, the skin gradually lost its lividity, the urine became free; she slept much till the 16th, and on that day her pulse reached a normal condition. On the 17th the injections were discontinued, appetite returned, and she began to take solid food, and on the 19th she was discharged, well. No record is made of the first passage of urine. She had no cramps after admission, and it is not known whether she had any before.

CASE VII.—*Entered in third stage. Died.* August 3. Arnold Diedrich, æt. 39. Entered at 10 A.M. Was taken sick August 1st, at 9 A.M., with "rice-water" vomiting and purging, and cramps; had had diarrhœa for several days previously; urine suppressed. Reports no vomiting since yesterday morning, but dejections continued through day and night; no cramps since yesterday morning; no urine. Now, skin cool; very slight lividity; pulse 96, feeble; voice husky; tongue clean, somewhat œdematous; no stupor. *Hot bottles around body and legs; brandy*, ℥ss., *every two hours; beef tea.*

August 5. Continued with little change till last evening, when slightly delirious and inclined to stupor. Got *spts. ætheris nitrici*, ʒj., several times. This morning passed urine for the first time. Is brighter.

August 6. Stupor returned and increased through day, mingled with muttering delirium. A pint and a half of urine, by catheter, at midnight. Refuses all nourishment or stimulant.

Became completely comatose in afternoon, and died at 9 P.M.

From July 1st to November 1st, 816 cases of cholera were reported at the Health Office, and confirmed by sanitary inspectors, as occurring in the Metropolitan Sanitary District on Long Island. 595 were fatal. 86 of these were in Kings County Penitentiary, 47 in Kings County Hospital, 9 in Flatbush and other towns in the County, and in Brooklyn 674 cases, of which 477 were fatal. The tables introduced below show the distribution of the fatal cases in Brooklyn up to

September 29th, after which time there were six deaths, the last being on the 20th of October. The tables exhibit, also, the deaths from all zymotic diseases, and the total mortality in Brooklyn from July 1st to September 29th.

TABLE I.—*Report of Mortality in Brooklyn, from July 1st to September 29th, 1866, with Meteorological Observations for the same period.*[1]

FOR THE WEEK ENDING	Meteorological Observa's. Maximum Temperature.	Minimum Temperature at night.	Average Humidity—Saturation being 100.	Total Rainfall.	Cholera.	Cholera Infantum.	Diarrhœal Diseases	Total Zymotic Diseases.	Total Deaths.	Rate of Yearly Mortality per Thousand.
July 7	97	65	48	.10	1	45	5	68	169	29.6
" 14	100	66	$40\frac{5}{7}$	.07	9	76	22	127	268	47.
" 21	102	60	$48\frac{1}{7}$	.80	22	122	32	207	390	68.
" 28	86	64	$55\frac{1}{7}$	1.40	41	72	26	150	278	48.8
August 4	86	64	$55\frac{1}{7}$	1.40	68	73	30	207	310	54.4
" 11	84	60	48	1.10	109	61	29	227	357	62.4
" 18	81	58	$58\frac{3}{7}$	1.70	89	57	36	218	320	56.2
" 25	82	55	58	2.00	54	43	28	150	249	43.6
September 1	85	58	54	.50	21	37	23	105	226	39.5
" 8	86	66	64	.63	24	32	32	109	225	39.5
" 15	82	50	51	.87	10	37	26	98	197	34.6
" 22	85	50	66	2.10	12	25	24	81	178	31.2
" 29	...	..	..	....	11	22	21	82	187	32.8
Totals					471	702	334	1809	3354	

TABLE II.—*Weekly Reports of Mortality from Cholera by Wards.*

WARDS.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
July 7	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
" 14	..	..	1	..	..	1	..	..	1	..	..	6	..	..	..	..	..	..	..	.
" 21	..	..	..	..	..	4	..	..	..	..	1	17	..	..	..	..	..	..	..	..
" 28	..	2	1	..	1	4	2	..	..	4	..	25	..	..	..	.	..	1	..	1
August 4	1	1	..	1	1	4	..	6	..	2	5	46	..	..	1	..	..	..	..	..
" 11	1	.	..	..	3	9	5	7	2	4	15	53	..	..	..	1	..	4	..	5
" 18	2	2	..	..	2	10	1	3	4	9	10	43	..	..	..	1	..	..	..	2
" 25	..	4	..	..	4	9	..	3	3	2	10	16	..	2	..	..	..	..	..	1
September 1	..	2	..	..	1	4	..	..	..	1	8	5	..	..	..	..	..	..	..	..
" 8	..	1	..	..	5	6	..	..	.	2	5	5	..	..	..	..	..	..	..	..
" 15	..	1	..	..	3	3	..	..	..	..	1	1	..	1	..	..	..	..	..	..
" 22	..	..	..	..	..	4	..	..	..	..	2	5	..	..	..	..	1	..	..	..
" 29	1	..	..	1	..	1	..	1	.	..	1	1	..	..	..	..	5	.	..	..
Totals	5	13	2	2	20	59	8	20	10	24	58	224	..	3	1	2	6	5	..	9

[1] The mortality tables were made up from the weekly reports of Dr. R. C. Stiles, Assistant Registrar, M. B. H., in charge of the Bureau of Records and Vital Statistics for Kings County. The deaths at the Penitentiary are not included in the tables.

Of 471, the number of fatal cases of cholera to September 29th, 224 occurred in the 12th ward. This ward is situated almost wholly on Red Hook, which was originally a group of small islands and peninsulas, intersected and overflowed by tide-water. Much of it is "made land," and all lies low and level, and is almost wholly without sewerage. The water still flows over portions of it, and stands in filthy pools on many of the lots lying below the level of the street, and are receptacles of animal and vegetable matters, which lie in large quantities exposed to sun and water. Throughout the ward the privies have close vaults, which, during the summer, were mostly found full, and in many instances overflowing. Part of the 6th ward is similarly situated and filthy. Examination of both wards by sanitary inspectors discovered a densely crowded population in some of the most sickly points, with various nuisances of serious detriment to health. Pigs, goats and cows were numerous; cellars were sometimes inhabited by families, or piled deep with filth and garbage, the accumulation of years, and slops were generally poured upon the street.

In all the quarters of the city where cholera appeared, with the exception of isolated cases, the population was of similar character, and the tenements were crowded and more or less exposed to the injurious influences of overflowing privies and accumulated filth.

The first case of cholera occurred on the 7th of July, in the 12th ward. During the next week there were cases in seven different wards. The epidemic culminated in the week ending August 11th, when there were 109 fatal cases in the city, and after September 1st the number was inconsiderable.

Its increase and decline were steady, and uninfluenced by weather or temperature, as will be perceived by reference to Table I.,[1] which gives a meteorological record of the season. During the extremely hot weather of July, when the total mortality was immensely increased, chiefly by diarrhœal diseases, and amounted to 390 in one week, the deaths from

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[1] I am indebted to Dr. Harris, the accomplished Registrar of the Board of Health, for the meteorological table, which is made up of observations carefully made at three different points in New York city.

cholera were only 22, and the increase in the prevalence of the disease throughout the month was gradual and undisturbed.

The germs of cholera in the atmosphere—constituting the epidemic influence—evidently vary much in their abundance in different epidemics, one epidemic being universally less extensive than another; the present one, for instance, having exhibited a smaller number of cases than some former ones throughout Europe and America, while the type of the disease has been as well marked and severe as ever. Its comparative extension as an epidemic in different cities is regulated by their local conditions, which are always observed to be important agents in its development, and are more obviously so when the epidemic cause is mild. The infrequency of its appearance in rural districts, or anywhere away from large towns, adds confirmation to the view that unwholesome influences of a public nature are required to furnish the requisite soil for the epidemic influence to act upon. When the germs of cholera surround us, an excess of decomposed organic matter in the atmosphere speedily develops in the system the conditions which are favorable to their reception; so also does any considerable reduction of the vital powers by chronic disease, by habitual intemperance or occasional excess. In the present epidemic, from its mildness, there was a peculiarly favorable opportunity to observe the operation of local and individual causes, which are not so evident in epidemics of greater severity.

Of all the exciting causes of cholera, there appears to be no source of atmospheric contamination so efficient as crowding in habitations. Striking instances of this influence appeared in the preference of the disease for public institutions, where a large number of persons were congregated under one roof, as in the Kings County Penitentiary, the Jail, the Truant Home, and on Blackwell's Island. In all these institutions the disease broke out almost simultaneously, and as rapidly disappeared on the dispersion of the inmates.

At the Penitentiary 86 persons were attacked with cholera, the first case occurring on the 21st of July, followed by several cases every day, until the night of the 3d of August, when 30 were attacked. On the 5th of August, all the inmates who were well were removed to tents outside the inclosure. A

wooden building within the yard had been previously used as a hospital. Only six cases occurred after removal to the tents, and three of those were attendants, who continued to sleep in the Penitentiary. 64 of the 86 cases were fatal.

The history of the epidemic in the Workhouse on Blackwell's Island, and its control by general purification and all possible scattering of the inmates, are equally striking. Under the direction of Prof. Hamilton, "the inmates were distributed as far as the vacant places in the building would permit, the cell-doors were left open at night, the night-buckets were supplied with disinfectants and left outside," the diet was improved, and every possible step taken for cleanliness and the chemical destruction of the excreta. The epidemic began to decline from the day these measures were fully carried out, and in five days more it ceased entirely. It lasted only nine days, during which time 123 died of the 800 inmates of the institution. All the particulars, which are of unusual interest and value, have been published by Prof. Clark in the *Medical Record* of Sept. 1st.

All the evidence of this epidemic, in private as well as in public institutions, indicates that the germs of cholera multiply abundantly in the confined atmosphere of an insufficiently ventilated dwelling, while the safety of inmates may be insured by thorough ventilation. Throughout the 12th ward, the disease clung especially to particular houses, situated nowise worse than many others, and peculiar only in having cholera cases already there. While on the other hand, no case originated in the hospital among the attendants, although at one time there were twenty-five patients there—with the single exception of one attendant, convalescent from a previous attack, and working beyond her strength—an exemption to be explained by the very free ventilation and cleanliness of the building.

Next in importance to the ventilation of dwelling houses and the removal and segregation of the sick, are all measures for the removal of sources of vegetable and animal decomposition, and the destruction of the excreta of cholera. The efforts of the Metropolitan Board of Health were directed to this end—their operations included the cleansing of streets

and premises and the removal of nuisances, as far as practicable. A very important part of their operations consisted in the personal visitation of all reported cases of cholera. For this duty a corps of medical inspectors was employed, five of whom were placed at the Hamilton Avenue Hospital, to inspect cases occurring in that quarter of the city. Under the orders of the Board of Health, upon the confirmation by an inspector of any reported case of cholera, disinfectants were immediately applied to every source of infection about the premises. Sulphate of iron was mixed with the matters discharged, the clothes from the patient were soaked for a day in a chlorinated solution, and chloride of lime was scattered about the premises and put into the privy in large quantity. In some cases houses were entirely vacated and cleansed, and the inmates removed to a house of refuge, which was kept in connection with the hospital. There were many instances where the operations of cleansing and removal apparently arrested the disease in different quarters of Brooklyn; but none so marked as in the history of cholera in Elizabethport, N. J., where a thorough, prompt and universal cleansing and disinfecting of all privies, cesspools and premises throughout the town, the removal of the sick and destruction of their clothes, put an end to the disease after a few days.

At the hospital the blankets and other clothing, after removal from a patient, were immediately immersed in a barrel of water, to which a pint of Labarraque's solution had been added, and, after remaining twenty-four hours, were boiled and washed. One woman washed these clothes daily for five weeks. Mattresses and pillows were thoroughly aired for several days, and if wet were burned.

Disinfection has been attempted elsewhere by steam, fumigation with sulphur, and saturation with permanganate of potass, carbolic acid, etc. It cannot be considered as proved that most of these disinfectants will destroy the atmospheric germs of cholera, although probably effectual when applied to the discharges. In steam we have an agent more efficient, from the power by its means of subjecting every thing within a house or apartment to a temperature destructive of all organisms.

By far the most important consideration, however, is the removal, before the invasion of the epidemic, of all the media for the development of the germs of cholera in the soil, or the air of houses and localities, by measures of general and local purification, and especially by complete sewerage of every inhabited district, and by every provision possible against crowding, and the faulty construction of houses.

36 Powers Street, Brooklyn.

Notes on Fractures of the Upper Extremity. By John H. Packard, M.D., one of the Surgeons of the Episcopal Hospital, Philadelphia.

NO. III.—FRACTURES OF THE SCAPULA.

In the first paper of this series the view was distinctly stated, in opposition to that upheld by M. Malgaigne and by Hamilton, that muscular action was a constant and important cause of displacement in cases of fracture. Not that it is either the sole or always the original cause; but that it exercises a constant influence in modifying or keeping up the displacement, which may perhaps be at first, or in great part, due either to the fracturing force, to the weight of the distal part, or to both.

A specimen, lately presented to the Museum of the College of Physicians of Philadelphia, by Dr. W. S. Halsey, exhibits a deformity which illustrates this view. It is a consolidated fracture of the left scapula—the line of breakage having passed directly across the bone, from just below the glenoid cavity, to just below the posterior end of the spine. Unfortunately there is no history of the case extant, so that we cannot tell what the influence of the fracturing force may have been.

But the deformity is exactly such as might be anticipated from a consideration of the muscular connections of the bone. The two fragments have slightly overlapped at the outer extremity of the fracture, and the lower has been carried outwards by nearly half an inch. We need not concern ourselves with the upper fragment at all, since it loses no point of sup-

port; the change of relation is due wholly to muscles acting on the lower portion of the bone. Chief among these muscles are the teres major and minor, the infra-spinatus, and the lower and larger part of the subscapularis, all which pull the fragment upwards and outwards. This action would be very slightly resisted by the scapular head of the triceps, and still more slightly by the rhomboideus major. The fibres of the serratus magnus inserted into the lower fragment would draw it forwards and outwards; the pectoralis minor would keep the upper fragment still in its normal relation to the thorax, while the lower, not thus controlled, would overlap the upper by its outer angle.

A specimen, in which the deformity is singularly like that in this case, is represented by Malgaigne in his Atlas, Pl. iv., Fig. 3.[1] It was taken from the body "of a young epileptic, who, long before his death, had had his bone broken by a fall on his back." I cannot regard this similarity between two instances of so rare a fracture as a mere coincidence, when the displacement is so fully and accurately accounted for by muscular action.

FRACTURES OF THE HUMERUS.

It might at first sight seem strange that the head of the humerus should so constantly escape fracture in falls on the hand, or in many cases where the bone gives way at its upper part. But on careful study of it in section, we find that the thin hemisphere of compact substance which is presented for articulation with the scapula, is everywhere stayed up by columns of cancellous tissue, so as greatly to increase the strength which its arched form gives it. By no other arrangement of the same amount of bony material, could an equal degree of resistance be attained.

Nor must it be overlooked that the junction of the epiphysis with the shaft constitutes another and a very important strengthener of this part of the bone. It corresponds somewhat closely with the articular layer, and forms a basis for the supporting columns of the latter. Whatever shocks are sus-

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[1] Described in his Traité des Fractures, etc., vol. i., p. 500, and in the translation of this volume, p. 403, and Fig 24.

tained by the head of the bone must therefore come secondarily upon the compact substance seen in section running across about an inch lower down, and their effect must in this way be greatly diminished. Fig. 1 accurately represents the line of this epiphyseal junction.

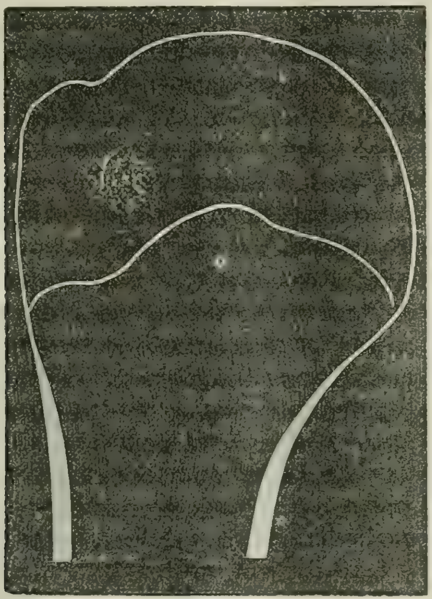

Fig. 1.

In a paper recently published,[1] Mr. Jonathan Hutchinson, of London, says:

"We will classify fractures of the humerus near the shoulder joint, not into those at the surgical neck and those at the anatomical neck, but into those *below the tuberosities* and those *through the tuberosities*. . . . In any case of separation of the epiphysis in which the two fragments should be thoroughly liberated from each other, the epiphysis itself would in all probability be displaced by the three muscles attached to it (subscapularis, supra-spinatus and infra-spinatus), in such a direction that its under surface, instead of looking downwards, would look directly outwards. There is nothing whatever to counteract these muscles."

[1] Hutchinson: Medical Times & Gazette, March 10, 1866, p. 247.

My own belief is, that the line of fracture varies greatly in these cases, mainly, perhaps, according to the different positions in which the humerus happens to be held when subjected to the two opposing forces, whatever they may be, by which the fracture is caused. But, from the study of cases and specimens, I am led to think that four classes may be made out; the first comprising cases where the line of separation corresponds, above, to the anatomical neck of the bone; the second, those in which it runs through the lower border of the tuberosities, externally, and at or near the anatomical neck, internally, *i. e.*, through the epiphyseal junction; the third, where it involves the surgical neck proper; and the fourth, where the greater tuberosity alone is broken away.[1]

When we analyze the relations of the various muscles of the shoulder and arm to the humerus, we find that this bone is acted upon as a lever, the fulcrum being generally at the joint. Around this joint are several muscles, the supra and infra spinatus, the subscapularis and the teres minor, which act at the

Fig. 2.

[1] The annexed figure, exhibiting, as nearly as may be, the several varieties of fracture to which the humerus is liable, may, perhaps, be best introduced here. The dotted line beginning at *a* indicates the direction of epiphyseal separation; that at *b* denotes the so-called fracture of the anatomical neck, but which, as stated, is usually partly intra and partly extra capsular. At *c* is seen the usual line of fractures of the surgical neck; at *d* is indicated separation of the greater tuberosity by itself. Fractures of the shaft, designated for completeness by the line beginning at *e*, may occur at any point, and may run in almost any direction. The lines *f* and *g* denote respectively transverse fractures of the lower portion of the bone, and such as, being more or less nearly transverse, are accompanied by splitting downwards into the elbow joint at *g′*. At *h* is seen separation of the epitrochlea (sometimes improperly called fracture of the inner condyle); *k* is a nearly similar fracture, but involves the trochlea itself. At *i* we have fracture of the outer condyle, and at *m* fracture running from above the outer condyle downwards and inwards, so as to involve a part of the trochlea.

same time as safeguards against dislocation, keeping the head of the humerus duly applied to the glenoid cavity, and as rotators of the former upon the latter. The long tendon of the biceps aids these, and brings the forearm into direct relation with the scapula. In like manner, the long head of the biceps acts posteriorly. The coraco-brachialis and short head of the biceps would, in the absence of the other muscles, bring the elbow upwards and inwards, and tilt the upper end of the humerus outwards away from the scapula. Nothing need be said here of the obvious action of the pectoralis major, teres major, and latissimus dorsi.

As to the influence of the muscles now briefly enumerated in the production of fracture, it is probably incidental only. In one case, the surgical neck of the humerus gave way while the patient was throwing a ball; but the "severe and deep-seated pains" felt in the bone for months previously would point to the existence of disease.[1] Here the rationale was clearly the same as when a mast or a flagstaff snaps off at a weak point near its base, during a gale; very probably the contraction of the shoulder muscles would aid the momentum of the lower part of the limb in causing the fracture. In all the other recorded cases that I know of, the breakage took place below the insertion of the deltoid, just as a mast or flagstaff would be most likely to give way above the point of attachment of its stays to it.

It must be borne in mind that the muscles, as remarked in a previous paper, are not inserted into the bones at exactly corresponding points, so that two muscles would very seldom accurately oppose one another, even if their power were nearly or quite equal. This fact bears equally upon the muscular theory of displacements.

When the humerus is broken, the line of fracture passing between the head of the bone and the tuberosities and terminating below somewhere outside of the joint-capsule, there may be no actual displacement whatever of the upper fragment, it still remaining in contact with the glenoid cavity. But the deltoid,

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[1] Goyrand: quoted from Vidal by Malgaigne, Traité des Fractures, etc., tome i., p. 515. Translation, p. 415.

biceps, coraco-brachialis and triceps will draw the lower fragment directly upwards; and should union occur, the motions of the arm will always be hampered in the upward direction, the tuberosities sometimes coming into contact almost at once with the acromion process. If, at the same time, the long tendon of the biceps is displaced from its groove or ruptured, the lower fragment will be so rotated backwards as to crowd the head of the bone forwards, and produce a curious state of things.

A case, which lately occurred at St. Joseph's Hospital, in this city, and which I saw by the kindness of Dr. Boker, will illustrate this.

On the 21st of February, a boy, about ten years of age, was admitted, having been caught under a train of eight coal-cars, all of which passed over him. Besides other injuries, he had a fracture of the right humerus, very close to its head, the separation being plainly felt in the axilla. Dr. Cruice, the resident surgeon, stated that the head of the bone had been dislocated downwards, and reduced by him. Owing to the contusion and swelling, the exact line of fracture could not then be clearly made out. The treatment adopted was simply rest. Union took place, and at the end of two months the state of the part was as follows: The shoulder was pointed, the deltoid drawing up the humerus, at the same time that the coraco-brachialis gave it a tilt outwards, aided, perhaps, by the short head of the biceps. The long head of the biceps had been either broken or displaced. By reason of the upward drawing of the lower fragment, the attachments of the axillary muscles were raised, and the axilla had lost depth. On rotating the arm, the orbicular head of the humerus was brought plainly forward under the pectoralis major, much more than it could normally be, because the supra-spinatus, infra-spinatus and teres minor had rotated the upper end of the main fragment backwards, during the process of union. The subscapularis seemed to have been broken across. Passive motion of the arm could be made readily in any direction, except by carrying the elbow directly upwards and outwards, when the tuberosities struck the acromion almost at once, and arrested the movement.

A specimen (No. 169) in the Mütter Museum, exhibits, I think, a condition much like that which must have obtained in Dr. Boker's case, just mentioned. It is a humerus of the left side, in which a fracture has passed through the anatomical neck internally, with separation of the lesser tuberosity and a portion of the greater, which is split vertically through its middle facette. From the groove between the tuberosities there runs off another outwards and backwards around the edge of the head of the bone, in a line corresponding, therefore, with the normal constriction at the anatomical neck, as if the long tendon of the biceps had been brought into such a relation by the rotation outwards of the humerus. The lower fragment has been drawn inwards and backwards, and the head of the bone brought forwards under the coracoid process, the tuberosities being crowded outwards; and the whole bone, when union took place, rotated outwards, so as to prevent the hand being brought across the body, unless by the adduction of the elbow.

Here the change in position of the bicipital tendon has entirely prevented the rotation upwards of the upper fragment. It cannot be ascertained whether the head of the bone was separated from the tuberosities or not; if so, the presence of the bicipital tendon in its new position must have held the outer fragment in place with regard to the head of the bone. The complexity of the change prevents this displacement from being exhibited even in a series of diagrams, and I must, therefore, trust to the foregoing description to make my meaning clear. I need scarcely say how much the value of this specimen would be enhanced by a full knowledge of its history.

When, as in the second class of cases, the fracture passes through the lower border of the tuberosities, and thence horizontally across the bone, we can again trace distinctly the effect of muscular action. Here the upper fragment is rotated by the supra and infra spinatus and teres minor, and in a less degree by the subscapularis and long tendon of the biceps, so as to bring its lower broken surface somewhat outwards; the lower fragment is at the same time drawn inwards by the pectoralis major, teres major and latissimus dorsi, opposed in some degree by the coraco-brachialis and short head of the

biceps, as well as by the scapular head of the triceps. A very marked instance of such displacement, in a specimen in the Mütter Museum (No. 170), is represented in Fig 3. The lower fragment overlaps the upper inwardly, and is in close contact with it, while the latter is so tilted by the action of the scapular muscles, that a space is left between the two fragments at the outer part of the fracture. This space is, in the real bone, bridged over by a deposit of callus, omitted in the drawing for the sake of greater distinctness.

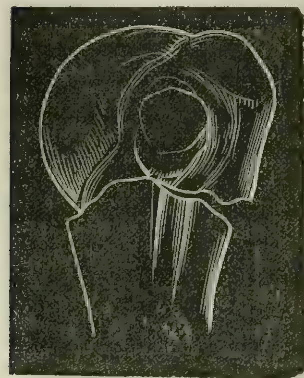

Fig. 3.

In the third class of cases, the deformity is less apt to be permanent, since the use of a pad in the axilla, or of a splint extending far up on the inner side of the arm, crowds the lower fragment outwards, while the upper fragment is pressed inwards by the bandage, or still more effectively by the pasteboard cap over the shoulder, which is very commonly employed.

In all the other specimens available to me for examination, and in the drawings from nature given by Sir A. Cooper, Malgaigne and R. W. Smith, the deformity is the same, and is adequately accounted for only by the unvarying influence of the muscles above mentioned. By Malgaigne, R. W. Smith and Hamilton, indeed, this explanation of the displacement is distinctly stated; but it seems to me to have been too much lost sight of in connection with the subject of treatment. Without having any definite statistics on the subject, and from the examination of but a very limited number of specimens, I would hazard the suggestion that the line of fracture through the surgical neck of the humerus is generally oblique from above downwards and inwards, on a plane more or less closely parallel to that of the anatomical neck of the bone; and that this circumstance lessens very much the degree of deformity, since the fragments would be each in the way of the other's displacement.

Should a fracture occur in the other direction (from above,

downwards and outwards), it is difficult to see how the resulting deformity could fail to be very great. The scapular muscles, the supra and infra spinatus, teres minor and subscapularis, would act freely on the upper fragment, rolling the head of the bone on the glenoid cavity, and bringing the broken end outwards against the inner aspect of the deltoid,[1] while the pectoralis major and other muscles, acting on the upper end of the lower fragment, would draw it inwards without restraint. Nor would the employment of an axillary pad be apt to mend the matter; it would rather tend to keep the upper fragment in its abnormal position. We might readily imagine the broken end of the shaft brought into contact with the inner surface of the upper fragment. How greatly the extent and power of the motions of the arm would be impaired in such a state of things will be seen at once.

Cases of the fourth class mentioned, those, namely, in which the greater tuberosity, usually with a small portion of the head, is detached from the remainder of the bone, are very seldom met with. But from the recorded instances it is clear that muscular action is the cause of the deformity, just as in the parallel case of fracture of the great trochanter.

The rounded form of the shoulder is lost because the greater tuberosity is drawn upwards and inwards under the acromion, and because the deltoid is slightly stretched by the weight of the arm, the subscapularis, pectoralis major, teres major and latissimus dorsi pulling the bone inwards and somewhat downwards, so as to cause its head to distend the capsule in this direction. Hence the resemblance to dislocation, which has probably led to error in diagnosis in more than one case of this kind.

Another cause may be assigned for the second element of the deformity, namely, the fracturing force, which, in several of the recorded instances, is expressly stated to have been a fall on the point of the shoulder; but this, although quite competent

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[1] This I have recently seen in a case of railroad injury, the humerus being completely crushed to within two or three inches of the shoulder. While the patient was being etherized, in order to disarticulation, the point of the upper fragment was repeatedly thrust strongly against the inner surface of the deltoid by the muscles mentioned.

to give rise to the change in place of the head of the bone, could not, of course, reproduce it after its correction by the surgeon.

Of all the accounts referred to, that given by Mr. R. W. Smith[1] is the best, and I think a careful study of his description will bear out what I have said as to the influence of the muscles.

One circumstance must not be overlooked, which, doubtless, modifies greatly the influence of the muscles in giving rise to displacement, in the first three of the classes of fractures just described, and that is the degree of impaction existing between the fragments. Especially would this affect epiphyseal separations, and perhaps also fractures of the surgical neck. But while on the one hand such impaction may limit the degree of displacement, on the other it may hinder the surgeon in his attempts at bringing the broken ends into their normal relation—since in making extension downwards on the lower fragment, in order to free it, he gives an opportunity to the muscles to displace more completely the upper part of the bone.

What practical inferences may be drawn from the foregoing statements in regard to the treatment of fractures of the upper portion of the humerus? It seems to me that while patients so injured generally regain some power of using their arms, the degree of this restoration is, in most cases, far less than might be looked for if care were taken to obviate the displacing of the fragments by muscular action.

Not a few of the recorded cases were those of young and able-bodied persons, to whom the loss of power or of freedom of motion of the arm would be no trifling matter. In old and feeble patients, as in the parallel instance of fracture of the femur very high up, we may often content ourselves with keeping the limb at rest in any comfortable position. But in cases of the former class, I think we may often do much by making extension in the proper direction, and by putting the limb up in such a manner as to obviate the reproduction of the displacement.

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[1] Smith: A Treatise on Fractures in the Vicinity of Joints, etc., chap. iv.

In fractures of the anatomical neck, there is less chance of a thoroughly satisfactory result than in the other cases. For we have here not only greater difficulty of diagnosis, but very often severe and obscure injury to the ligamentous structures (perhaps also to the muscular) around the head of the bone; and it is far more prudent to be satisfied with keeping down inflammation and trusting to nature than to interfere at hap-hazard. Nor, even if fully advised of the state of things, could we always succeed in improving it—as for example in the case from which was derived the specimen in the Mütter Museum, described on a previous page of this paper. This bone obviously belonged to a person in the prime of life; and I think that, beyond keeping the part at rest, surgery neither did nor could have done any thing whatever towards the result.

For such cases, the simplest treatment is the best; a narrow but somewhat thick pad going well up into the axilla, and a bandage confining the limb to the body, the forearm being brought up across the chest, would answer, if the patient's age, temperament and habits render it likely that he will keep still. If otherwise, an inside splint going far up into the axilla, thickly padded at its upper extremity, and extending to the ends of the fingers, with an angle at the elbow, would be safer. In very old and feeble persons, we may merely place the limb in a well arranged sling.

The case is different when the fracture involves either the epiphyseal junction, the surgical neck, or the greater tuberosity. Whenever the bone can be clearly made out to be broken at one of these points, we may be sure that the upper fragment *tends* to be tilted over inwards by the scapular muscles inserted into it, and the lower to be drawn away from it by the pectoralis major, latissimus dorsi and teres major. (Let me say, again, that this statement is founded upon, first, the normal anatomy of the part; secondly, the study of specimens; and, thirdly, the recorded cases.)

Under such circumstances it must be clear that very little can be done by way of controlling the upper fragment; sometimes, indeed, its position must remain undetermined. But if the state of things previously described be detected, we must try to make the lower fragment follow the upper. Hence ex-

tension, if made at all, should be made with the elbow carried away from the body; and the arm should be kept raised until union of the broken ends has become tolerably firm. Duverney, Coillot, Gély and Tyrrell all adopted this principle, but, as it seems, with different degrees of success.

The practical difficulty must be to ascertain the precise degree of elevation of the arm required in each case. This being determined as accurately as possible, a splint can readily be made, consisting of two portions, one to be secured to the trunk, and the other to fit the inner side of the arm—the more or less acute angle formed by them, well padded, to occupy the axilla. Tyrrell used a rectangular splint on this principle. Rest on the back in bed, for the first few days, would be highly desirable.

In fractures of the greater tuberosity, besides this raising of the elbow, pressure might be made with advantage, by means of a pad or a padded splint, in front of the head of the bone, so as to push it backwards into apposition with the separated piece.

Such a plan of treatment as that now described, in order to give the best results, would have to be carefully followed out for four or five weeks, until the callus become quite solid. Perhaps the uniting medium would be strong enough not to yield if the elbow were depressed at an earlier day, but a prudent surgeon would scarcely like to risk it.

One circumstance, which can hardly occur except in cases of very great violence, and which would be at once recognized if it did exist, would forbid a resort to this plan of treatment, and that is inflammation of the shoulder joint. If followed by anchylosis, with the elbow raised, the result would be a worse than useless arm.

In fractures of the *shaft* of the humerus, says Malgaigne, the displacements are "governed by no general law, except that of the direction of the fracture." This fact, which I would ascribe to the arrangement of the muscles parallel with the shaft of the bone, cannot be denied; yet we do find the relation of the fragments modified in many cases by muscular contraction. For example, in No. 174 in the Mütter Museum, we have a fracture running downwards and outwards, at very

nearly the middle of the humerus, and the upper fragment has passed outside of the lower, partly at least by reason of the contraction of the deltoid, supra and infra spinatus and teres minor, tilting the former as if for elevation of the elbow, and thus affording a fair chance to the biceps, coraco-brachialis and triceps to draw up the lower fragment. In No. 177, we have a fracture at about the junction of the middle and lower thirds of the bone; the same tilting of the upper fragment has taken place, so as to give rise to a decided angle outwards. Here we have also a slight angle forwards, due to the pull of the flexor and extensor muscles upon the lower fragment. This angle salient forwards is, I believe, invariable, although it often is but slight, in fractures of the humerus low down; it is analogous to the angle salient outwards, already noticed as occurring in fractures at the surgical neck of the bone.

Malgaigne speaks of improper treatment as by far the most common cause of angular deformities after fractures of the shaft of the humerus; and, indeed, great care is needed to secure good results in such cases. Both fragments afford a leverage favorable to the disturbing agencies; and not only are deformities apt to ensue, but non-union is more frequent here than in any other bone.

It would take up too much space to discuss here the various views and plans of authors in regard to the treatment of the cases now mentioned. I beg to offer a few remarks which seem to me of practical importance.

We have, at the back of the arm, a firm and even mass of muscle, the triceps. A short splint, made of pasteboard or a thin strip of wood, padded slightly, may be applied here with great advantage in nearly all fractures of the humerus. On the inner side the bone has a somewhat concave outline, owing to the projection of the epitrochlea below. Anteriorly, again, the biceps and brachialis anticus cover it firmly and evenly, so that pressure may be made through them very accurately.

We may therefore employ, in fractures of the humerus, an inside angular splint, the arm part padded so as to fill up the concavity of outline of the bone, with anterior and posterior short splints, reaching respectively from opposite the axilla to

the olecranon and bend of the elbow. These splints should be just broad enough, since if too broad they allow the broken ends to move upon one another, while if too narrow their edges will cut the skin. Adhesive strips about an inch wide may be first put on near the ends of the splints, and then an ordinary roller; by this means the latter can be removed with less risk for the needful examinations from time to time.

For several years I have employed, in fractures of the humerus in its lower third, a splint described by me in the Transactions of the College of Physicians of Philadelphia.[1] The difficulty in managing these cases is to get a perfectly firm support for the anterior part of the arm, and my plan is to add to the inside angular splint a piece which affords such support. Any carpenter can make it from a description, or very easily from a pattern. A piece of wood as long as the arm part of the splint (say ten inches long, and three or four inches wide for an adult), hollowed out lengthwise, is nailed on so as not quite to clear the bend of the elbow. Its lower end is to be cut away and rounded by the surgeon so as to adapt it to the case to be treated, while the upper end of the arm part of the inside splint, and the angle between the two, is rounded so as to come well up into the axilla. By carefully shaping and proportioning these parts, we have obviously a counterextension in the axilla, and an extending force at the bend of the elbow. Properly padded, and frequently examined, this splint has been found by me to answer an excellent purpose. It keeps the forearm in the most comfortable posture, that of semipronation, and the angle at the elbow may be safely changed from time to time, so as to prevent anchylosis. A posterior arm-splint of pasteboard may be very readily added, and often with great advantage.

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[1] Hays' Journal, July, 1865, p. 93.

Deformities of the Nose. Operation to Repair a Broken Down Septum Narium. By CHAS. F. TAYLOR, M.D., of New York.

As a contribution to what is conveniently called "minor surgery," though often requiring more careful study and skill than more dangerous and imposing operations, the following case is given, in the hope that its suggestions may be of service.

H., of Detroit, Michigan, a lad fourteen years old, was brought to me in November, 1865, for treatment for complete occlusion of the right nasal passage. I found the septum narium broken and doubled up, the fold of the cartilage projecting into and filling up the right nasal passage. It was supposed to have been done by a fall on the nose when about four years old. The cartilage was hypertrophied and unyielding, and did not seem susceptible of modification by any means short of an operation. There were so many objections to the ready operation of excising the extruded portion of the septum—the danger of troublesome hemorrhage from the pituitary membrane, the tardy healing of the exposed cartilage, the sensitiveness of the cicatrized surface, as well as the frequent failure of the operation itself to give the desired relief—that I was induced to devise an operation which seemed to promise important advantages.

Preparing myself with a very small knife, having a thick back, awl point and short cutting edge, I introduced it through the integument which covers the inferior border of the septum (Fig. 1), and, carefully guiding it *between* the mucous membranes by one finger inserted in the nostril, the septum was cut longitudinally through and through in several places along the bent portion, till the tumor became soft and compressible. On withdrawing the knife, the wound, which was not more than a mere prick of an awl through the skin, immediately closed up, and not half a dozen drops of blood

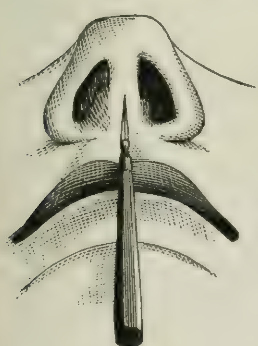


Fig. 1.

were lost. The mucous membranes were not pierced in any place, the knife having been kept carefully between them. A clamp of hard rubber had been previously prepared, exactly fitting the nasal passages, one leg of which was then introduced into each nostril (Fig. 2) and screwed tightly together, compressing the tumor, straightening up the septum, and bringing the mucous membranes covering the cartilage near together. The hypothesis was that the operation and compression would excite a certain amount of inflammation in the parts, and that, as in subcutaneous tenotomy, the wound being surrounded on all sides by healthy tissue, healing by first intention, or at least rapid reparation, might be expected. It was necessary, however, that the clamp should be kept on long enough to secure the desired result, and not retained so long as to cause sloughing and possible disaster. The clamp was removed in eighteen hours after its application and reapplied less tightly for twelve hours longer, when, on removing it, the septum remained in its natural upright position. Healing by first intention had taken place, and both nasal passages were entirely unobstructed. There was slight nasal discharge, which soon subsided, and the cure was complete. During the whole time, even when the clamps were on, the patient suffered no pain or the least inconvenience.

Fig. 2.

In this case, the septum being depressed and partially doubled on itself, there was little actual deformity, save a somewhat flattened appearance of the nose; but the voice was injured by the stopping up of one nostril, and it was for this that an operation was desired by the parents. But why might not the same or a similar operation be just as available for the removal of the common deformity, when the septum, and consequently the nose, is twisted to one side? In such a case I would suggest cutting the septum cartilaginum *obliquely* through, antero-posteriorly, near its base—keeping, as in this case, the knife carefully between and not piercing the mucous membranes —and then adjusting a clamp, as in this instance.

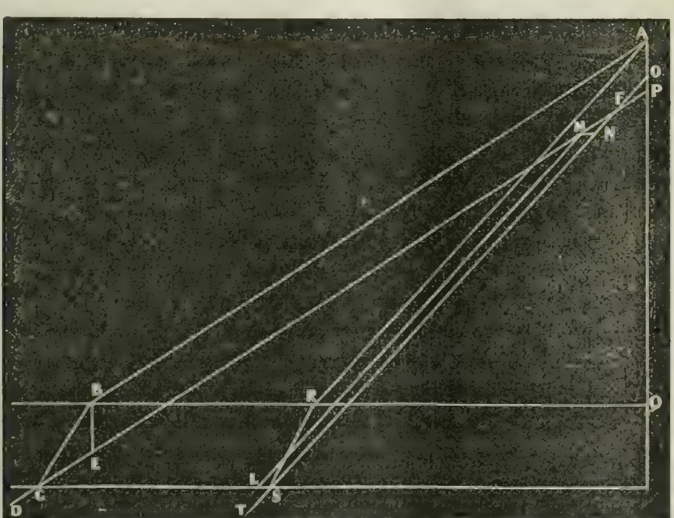
Refraction of a Small, Oblique Pencil of Diverging Rays by a Glass Plate with Plane Parallel Surfaces. By G. HAY, M.D.

[Read before the American Ophthalmological Society.]

In measuring with the ophthalmometer of Helmholtz, use is made of the lateral deviation of the image of a small object by means of a glass plate held more or less obliquely to the direction of the object. The image, however, is not only displaced laterally, but, according to Fick, in the "Med. Physik," p. 292, is brought a little nearer to the observer. This latter displacement, though not requiring to be measured in using the instrument, is of some optical interest, as may be seen by considering the following problem.

To find the virtual focus of a small oblique pencil of diverging rays refracted by a glass plate with plane parallel surfaces.

Solution. Consider first the rays in the section of the pencil made by a plane passing through its axis and perpendicular to the plate, the lines in the figure lying in such plane.



Let the broken line A B C D represent a ray proceeding obliquely from the point A, the origin of the pencil, to the plate B C Q, and refracted by it. Continue D C, which is parallel

to A B, to P, its intersection with A Q, the perpendicular from A to the plate. On the continuation of D C, mark off C M equal to B A. The focus F of the rays in the section of the pencil above referred to will be between M and P.

Proof. Let A R S T represent another ray in plane A B Q, making a small angle with A B, and refracted by the plate. Take C L, equal to B R. C S must be greater than C L. L M must be parallel to R A. T S, parallel to A R, will, if continued, meet the line D C P at a point F farther from C than M is. Draw M N parallel to L S.

Call the angles of incidence of A R and of A B respectively a and a', and let

$$a' - a = \Delta a = \text{angle B A R}.$$

Similarly, let the angles of refraction be β and β', and let

$$\beta' - \beta = \Delta \beta;$$

triangle M N F gives

$$\text{M F} : \text{M N} = \cos a : \Delta a;$$

$$\text{M F} = \text{M N} . \frac{\cos a}{\Delta a} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad [1]$$

To find M N (= L S).

A ray parallel to A B and meeting the plate at R would be refracted parallel to B C, and would pass through L. Then angle L R S = $\Delta \beta$. (The line L R is not drawn in the figure.) From the relation between angles of incidence and refraction, $\sin a = n \sin \beta$; we obtain, approximatively, Δa being small,

$$\Delta \beta = \Delta a . \frac{\cos a}{n \cos \beta}.$$

From triangle L R S we have

$$\text{L S} : \text{L R} = \Delta \beta : \cos \beta;$$

$$\text{L S} = \Delta \beta . \frac{\text{L R}}{\cos \beta} = \Delta a . \frac{\cos a}{n \cos \beta} . \frac{\text{L R}}{\cos \beta} = \text{M N};$$

and by [1],

$$\text{M F} = \frac{\text{L R}}{n} . \frac{\cos^2 a}{\cos^2 \beta}.$$

Triangle M A P, equal to triangle B C E, B E being perpendicular to B R (line M A is not drawn in the figure), gives

$$\text{M P} : \text{M A} \ (= \text{L R}) = \sin \beta' : \sin a' = \frac{1}{n};$$

$$\text{M P} = \frac{\text{L R}}{n}.$$

Therefore, M F < M P, since $\frac{\cos^2 a}{\cos^2 \beta} < 1$, a being greater than β, or F lies between M and P.

If we suppose a' very small, M A becomes nearly equal to the thickness of the plate; M A, M P and A P have nearly the same direction. Then M F = M P = $\frac{2}{3}$ the thickness of the plate, consistent with the usual result that for a small direct pencil the image approaches the plate by one-third the thickness of the plate.

Thus far only the rays of the pencil situated in a plane passing through its axis and perpendicular to the plate have been considered. The other rays may be divided into sets, each set lying in a plane passing through the line A Q and making a small angle with the plane A B Q. The focus of each such set will have a situation in its respective plane similar to that of F in the plane A B Q. It is also to be noticed that if the rays of any set are continued back in their respective plane beyond their focus, they must pass through the line A Q in the neighborhood of the part O P. So that for the whole pencil there are two foci, each linear in extent: one in the line A Q, near the portion O P; the other passing through the point F, and at F perpendicular to the plane A B Q. This is consistent with a remark on page 238 of the "Physiologische Optik" of Helmholtz, as follows: "Speaking generally, homocentric rays, after they have been refracted by a prism, are no longer homocentric, but every infinitely small pencil of rays has two foci, as is the case with homocentric rays refracted by ellipsoidal surfaces, or, when incident obliquely, by spherical surfaces."

As to the question whether this want of homocentricity in the refracted rays should not cause indistinctness in the image seen through the plate, it might be shown that the length of each of the two lines in which the rays unite is smaller in proportion as the size of the pencil and the thickness of the plate are smaller.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

I. *Manual of Materia Medica and Therapeutics. Being an Abridgment of the late Dr. Pereira's Elements of Materia Medica, arranged in conformity with the British Pharmacopœia, and adapted to the use of Medical Practitioners, etc., etc.* By Frederick John Farre, M.D., Cantab., F.L.S., Lecturer in Materia Medica in St. Bartholomew's Hospital, etc., etc., assisted by Robert Bentley, M.R.C.S., F.L.S., Professor of Materia Medica and Botany to the Pharmaceutical Society of Great Britain, etc., etc., and by Robert Warrington, F.R.S., F.C.S., etc., etc. Edited, with numerous references to the U. S. Pharmacopœia and many other additions, by Horatio C. Wood, Jr., M.D., Prof. of Botany, Auxiliary Faculty of Medicine of the University of Pennsylvania, etc., etc. Philadelphia: Henry C. Lea, 1866. 8vo, pp. xxxiii., 1030.

II. *Practical Therapeutics, considered chiefly with reference to Articles of the Materia Medica.* By Edward John Waring, F.R.C.S., F.L.S., Surgeon in Her Majesty's Indian Army. From the Second London Edition. Philadelphia: Lindsay & Blakiston, 1866. 8vo, pp. 815.

I. Dr. Pereira's original work has been pronounced by eminent authority "the most complete and comprehensive treatise on Materia Medica extant in the English language." We fully agree with the estimate thus put upon it, for as a model of laborious and scientific research and investigation, and as an exhaustive essay on the subject (so far, at least, as relates to the British Materia Medica), it stands unrivaled. But we cannot think that the practical benefit derived from it has been commensurate with its scientific value, for its ponderous proportions, to say nothing of its uninviting details of technical description, have deterred all but the most devoted and enthusiastic admirers of this study from the attempt to master its contents. The work, therefore, has taken its place among our cyclopædias and books of reference, where it justly belongs, rather than as a text-book for the student or an aid to the busy practitioner. The proposal, then, of the present editors to reduce its size and to render it more available for general use is a commendable one, and we propose briefly to inquire how their task has been accomplished.

The reduction is accomplished by omitting all remedial agents except those termed pharmacological—as, viz , mental, hygienic, and the imponderable physical agents; by striking out of the pharma-

cological remedies all those not officinal; and by dispensing with all classifications of medicines except the two founded, the one on the chemical, botanical, or zoological classification of the substances employed or from which obtained, and the other founded on their physiological effects. The botanical and zoological characters of the remedies, and in many instances the description of the drugs, are materially abridged. Much valuable matter is thus thrown out, but not, we think, to the detriment of the work for the student's purposes. While these changes, however, have rendered the work more suitable for the use of British medical men and reduced its volume to about one-third of the dimensions of the original work, it would still, for evident reasons, be valueless for the American student. But here the labor of the American editor comes in to supplement the deficiencies. The U. S. Pharmacopœia is first introduced—and the U. S. processes for preparing drugs are given—while those articles of our Materia Medica list that had been dropped by the English editor are restored. Over one hundred articles on substances in our Pharmacopœia are thus added, with the result of again swelling the size of the volume; but that these additions were necessary, we have only to mention a few selected in our reading. Ammoniæ Valerianas, Sulphite of Soda, Chromic Acid, Subcarbonate of Bismuth, Oxalate of Cerium, Iodide of Lead, Pyrophosphate of Iron, Ammonio-ferric Alum, Sago, Veratrum Viride, Arrow Root, Tapioca, Chenopodium, Ignatia Amara, Lactucarium, Prunus Virginianus, Calabar Bean, Cimicifuga Racemosa, Iodoform, and Pepsin, besides very many others of less importance.

The American editor can very justly say, then, that "his office has been no sinecure." The result, however, of the labors of the different gentlemen engaged on the work has been to give us a compendium that is admirably adapted for the wants and necessities of the student. A little more minuteness in describing the therapeutical uses of some of the articles, and the introduction of recent but well sustained advances that have been made in this line, would have rendered the book still more serviceable. For instance, under Bromide of Potassium we find no notice of the remarkable effects of the drug in certain forms of wakefulness; and in view of the results obtained by Dr. Radcliffe, Brown-Séquard and others in the treatment of epilepsy, and which have been so widely diffused throughout our periodical literature, it is hardly satisfactory to have the subject dismissed with the remark, "it also seems to have a marked effect in epilepsy." Under Calabar Bean no mention is made of Dr. Ogle's

experience in the treatment of chorea, which promises so much in this obstinate affection.

The Bromide of Ammonium, which is lately attracting so much attention for its reputed virtues in hooping-cough, as first described by Dr. Gibb, is not found at all. No mention is made of the treatment of goitre and enlarged spleen by the external use of Biniodide of Mercury, which is scarcely excusable when we remember that the results of no less than 80,000 cases have been published in the "Indian Annals of Medical Science," and noted by Deputy General Inspector Maclean, of the British Army, in the last volume of the Army Medical Reports. Glycerine is briefly disposed of with the remark that "it is a useful addition to lotions, which it preserves in a moist state. When heated with starch it forms a 'plasma,' which may be employed as an ointment or as a material for the formation of ointments. Glycerine diluted with water is frequently applied to chapped hands." Hardly a fair estimate of the therapeutical value of this important agent, and a few hints from Hartshorn's monograph might have been borrowed with advantage. We are unable to discover any allusion to the use or doses of remedies by hypodermic injection, or of the employment of the remedial agents by the spray apparatus, which is now in such general use. And so we might notice many other specific deficiencies, but we are not disposed to be hypercritical. The immensity of the subject, the necessity of keeping the volume within a handy size, and the haste probably imposed in the preparation of the book for the American market, are an explanation for any shortcomings of this sort; and we willingly concede to the American editor that we have rarely examined a work that, on the whole, is more carefully and laboriously edited than this, or, we may add, that is more improved in the process of editing.

Dr. Pereira's essay on the *Physiological Classification of Medicines* is transferred to the close of the volume. There is a propriety in this change, for it will undoubtedly be better understood after some knowledge of the individual medicines has been acquired. The essay has been modified by Dr. Farre in some particulars, and to its manifest improvement. A carefully prepared posological table and index add materially to one's convenience in consulting the book.

II. Of Mr. Waring's volume we had purposed to ourselves to make a somewhat extended notice; but we gracefully decline the task, with the remark that, in our estimation, it is the best book of the kind ever written. It differs entirely in its plan and scope from Pereira's, but resembles more closely Stille's important work. The botanical and

chemical characteristics of the various articles of the Materia Medica are very briefly enumerated, and every thing is subordinated to the considerations of the medicinal uses and applications of these substances. It is indeed a treatise on *Practical Therapeutics*, and within the compass of a single volume of convenient size it comprises all that need be said on the subject. We have looked in vain for the omission of any important therapeutical agent or application of any agent that was brought to the notice of the profession up to the date of the publication. The alphabetical arrangement of the articles, though not, perhaps, scientific, is sensible; and the elaborate double index, first of diseases, referring to the appropriate remedies, and, second, of the articles themselves, make the volume unusually available for reference. Our admiration, not only for the immense industry of the author (for his book was compiled while stationed at Mergui, a frontier post occupied by the East India Company's forces, above 1,000 miles distant from Calcutta, and separated from civilization and all those aids which are presumed to be at hand in the preparation of works of reference), but also of the great practical value of this volume, increases with every reading or consultation of the same. We wish a copy could be put into the hands of every student and practitioner in the land.

A Manual of Auscultation and Percussion. By M. Barth and M. Henri Roger. Translated from the Sixth French Edition. Philadelphia: Lindsay & Blakiston. 1866. 12mo, pp. 161.

This little manual, which is a brief abstract of the larger work by the same authors, "Traité Pratique d'Auscultation," etc , gives, in a systematic and concise way, the directions necessary for acquiring a knowledge of auscultation and percussion. The various sounds elicited on examination of both the healthy and diseased chest are accurately described. The rules for practicing percussion are unusually clear and concise, neither so lengthy as to be wearisome nor so brief as to be unintelligible. The work is admirably adapted for the student, and not without value to those who have already, in a measure, mastered the study. The combination of auscultation and percussion, as devised by Dr. Clark and the late Dr. Cammann, of this city, is fully described, and due credit given to those gentlemen; but the method is spoken of in a decidedly deprecatory manner. Every one of experience must attest the great value of this method of physical exploration, and we think that the insufferable French vanity, which will

not admit that any thing of value can be originated outside of "la belle France," is sufficient to account for the estimate put upon the labors of our distinguished countrymen.

The publishers have issued the work in a very attractive guise, and we bespeak for it that extended circulation to which its merits certainly give it a claim.

A Manual of Medical Jurisprudence. By ALFRED SWAINE TAYLOR, M.D., F.R.S., Professor of Medical Jurisprudence and Chemistry in Guy's Hospital. Sixth American, from the Eighth London Edition, with Notes and References to American Decisions. By Clement B. Penrose. Philadelphia: Henry C. Lea. 1866. 8vo, pp. 776.

In the last number of the JOURNAL we noticed the English edition of Dr. Taylor's Manual, and are pleased so soon to see this beautiful American reprint. Some portions of the matter omitted by Dr. Taylor are restored, and a considerable amount of material is introduced from his "Principles and Practice of Medical Jurisprudence," thus rendering the volume more complete for those to whom his larger work is inaccessible. The illustrations are reproduced with great fidelity, and the notes of the American editor obviate the objection we made in speaking of the English edition—of the difference in the practice between the two countries. The insertion, too, of decisions by American courts lends additional value to the book as a guide for our students or practitioners. The publishers have done their part of the work well, and produced the book in an unusually creditable style—far superior, in our estimation, to the English copy.

Notes on Epidemics, for the use of the Public. By FRANCIS EDMUND ANSTIE, M.D., F.R.C.P., Senior Assistant to Westminster Hospital. First American Edition. Philadelphia: J. B. Lippincott & Co. 1866. 12mo, pp. 96.

"The main object of this essay," says the author, "is to furnish information which may assist the non-medical public to do their part in the work of prevention of disease." It is addressed to a British public, and the facts are principally drawn from British sources; but it is equally adapted for cis-Atlantic readers, and cannot fail to accomplish much in the work of popularizing this kind of information, of which the public at large stand so much in need. This popular ignorance has been unjustly attributed to the reticence of medical men, and their "reluctance to instruct the mass of mankind in those truths which

are capable of being understood and acted upon by all intelligent and moderately educated persons. Without admitting the full force of this allegation, there is no doubt that if the great men of the profession had written more for the people than they have, quackery would not be so rampant and wide spread as it is at present." The publication, then, of such a treatise as this is a step in the right direction, and its appearance is especially opportune at the present time, when we are just passing through an epidemic, every day's experience in which only tends to confirm our well settled conviction that in prevention and hygiene alone are to be found the most rational plan of treatment and the greatest chances of success.

Not only is this little treatise valuable to those for whom it is especially intended, but the medical man also will here find carefully collected and systematically arranged an amount of material that would require prolonged and wide-spread search for each one to gather for himself, while there is an additional advantage in the fact that the work is presented in an unusually readable and attractive manner. We attempt no analysis of the book, but simply content ourselves with the suggestion to each one to read it for himself, feeling assured that his time will not be misspent if he realizes but a tithe of the satisfaction and profit we have experienced in the perusal of it.

Cerebro-Spinal Meningitis; being a Report made to the Illinois Medical Society. By J. S. JEWELL, M.D., Professor of Anatomy, Chicago Medical College, etc. Chicago: 1866. 12mo, pp. 68.

In a short compass Dr. Jewell has well condensed the chief facts concerning a disease of "rapid course, not very amenable to treatment, and attended by a fearful mortality." He has evidently taken much pains to collect a large body of facts from all available sources, and by a careful analysis of them and judicious reasoning upon them tried to reach sound conclusions. There are four tabular statements of a good deal of value: "the first exhibiting the symptomatical; the second the post-mortem; the third the etiological and pathological; and the fourth the therapeutical histories of the disease. Following these is a discussion of the facts, in which the attempt is made to evolve their teachings. In each statement room is left for incidental facts and exceptional cases." The author has well succeeded in his aim, and his little work will abundantly repay perusal.

REPORTS ON THE PROGRESS OF MEDICINE.

SURGERY.

1. *The New Treatment of Cancer by the Hypodermic Injection of Dilute Acetic Acid.* (London Lancet, Nov. 3. 1866.)

At the late meeting of the British Medical Association at Chester, Dr. W. H. Broadbent, of St. Mary's Hospital, London, brought forward a novel treatment of cancer, which he had tried in some cases with advantage, and which is now exciting much interest and attention.

Dr. Broadbent conceived the idea that, by means of the hypodermic syringe, some fluid might be injected into a cancerous tumor, which might so far alter its structure and modify its nutrition, as to retard or arrest its growth. Acetic acid was chosen for the following reasons: This acid does not coagulate albumen, and might therefore be expected to diffuse itself through the tumor. If it entered the circulation it could do no harm in any way, either by acting as a poison, or by inducing embolism. Acetic acid rapidly dissolves the walls and modifies the nuclei of cells on the microscopic slide, and might be expected to do this when the cells were *in situ.* Experiment showed, although in healthy tissues acetic acid causes very severe smarting and burning, that unless very strong, it gives little pain when thrown into malignant structures. On the other hand, it acts energetically on cancer, but has comparatively little effect on normal structures. No precise rules can be as yet laid down as regards the employment of the acid, but Dr. Broadbent inclines to the use of a large quantity of dilute acid, rather than of a smaller proportion in more concentrated form. The strongest acid he has used has been composed of equal parts of water and of the strong acetic acid of the Pharmacopœia; the weakest, one part to four or five. About twenty or thirty minims of the acid liquid are thrown into the centre of the mass. The treatment is being followed, amongst other places, at the Middlesex Hospital by Mr. Moore and Mr. De Morgan, at St. George's by Mr. Holmes, and at the Westminster Hospital by Mr. Holt. The points of greatest interest seem to be these: Hitherto the aim in applying solvents to cancer has been to destroy the structure, which has then to be cast off, and so by repeated applications to remove the mass by sloughing, the effect of the caustic being limited to the immediate neighborhood of its application. By Dr. Broadbent's plan, however, the solvent fluid, as it does not coagulate albumen, rapidly diffuses itself throughout the tumor, and seems to bring about a solution of the substance. We have already heard of some cases in which, after the injection of acetic acid, the size of the tumor has been rapidly diminished, and this without any discharge externally. Such a result would seem to be explained by solution having taken place, followed by absorption. If further experience should show that by this plan of treatment cancerous masses can be so altered as to be capable of absorption, we shall have to congratulate Dr. Broadbent upon one of the most important additions to therapeutics of modern times. The use of the hypodermic syringe in the treatment of cancer suggested itself more than a year ago to Mr. Moore, who has injected various fluids, chloride of zinc, perchloride of

iron, etc. All his experiments, however, were made with liquids which coagulated albumen, and whose action, therefore, was limited. Whether Dr. Broadbent's plan proves to be perfectly successful or not, he is entitled to the highest credit for an admirable suggestion, not empirical, as is too often the case, but founded upon pure induction. It is curious that the constant observation of the effects produced by acetic acid upon cancer-cells under the microscope should not earlier have led to its application in the way so ingeniously suggested by Dr. Broadbent.

He relates, in his paper, four cases of cancer in which this method of treatment was successful. He would not attempt the destruction of any malignant tumor by this plan which had not involved the skin.

In the *London Medical Times and Gazette*, October 27, 1866, two cases of cancer, treated by Dr. Broadbent's method, are reported by Mr. C. H. Moore, in charge of the cancer wards of the Middlesex Hospital.

Case 1 was a recurrent cancer of the breast in a woman, æt. 46, previously operated on in February, 1865. There were four small cancerous nodules near and below the scar; three of them were of the size of peas, subcutaneous and movable; the innermost was twice that size, and was somewhat adherent to the skin and to the inner extremity of the scar. The integument being rendered insensible by ether spray, the largest nodule, and another situated within half an inch of it, were pierced by the injection canula through a single aperture of the skin; about half a teaspoonful of acetic acid and water—1 part acid, 3 parts water—was injected into and about the nodules. Eleven days afterwards the two other nodules were similarly treated. At this time the first two nodules were somewhat swollen, softer and indistinct. Twenty-one days after the first injection the inner two nodules had lessened greatly in size, and the œdema surrounding them had much diminished. On the eleventh day after the second operation, around the third and fourth tumors a swelling had formed, the outer part of which was soft, and ten times as large as either tumor before injection. On the twenty-fourth day after first operation, the first and second tumors were no longer distinguishable, having gradually dwindled away. On the forty-fourth day after the first operation, and the thirty-fifth after the second operation, there was no trace of the tumors first injected; the third and fourth tumors together formed a globular, firm swelling, about the size of a cherry-stone, surrounded by a little œdema, and appeared to contain a nucleus of solid growth considerably larger than before injection. Another injection will probably be necessary. The second case is one of great interest, and we give it in full. There was *cancer in the floor of the mouth and in the subjacent lymphatic glands.* The man was middle aged, with a florid, healthy look, and his previous health had been good. The mouth was filled up to the level of the lower teeth by a solid mass of cancer entirely ulcerated. The tongue lay on it, unaltered on its upper surface, tip and sides, but much restricted in its movements by the adhesion of its inferior part to the firm growth beneath. On his attempting to lift the tongue, a deep chasm, all ulcerated, was seen, separating a portion of the disease connected with the tongue from that in the floor of the mouth. The gums of the lower jaw were swollen with deposit of cancer, both inside and outside, and the teeth, blackened and loose, appeared to be set in sockets of the morbid growth. The glands beneath the jaw formed a cluster of hard growths. There

was much pain in the diseased parts, and in both temples, and the salivary glands were constantly filling the mouth with saliva, of which more than a pint and a half was spit up every day. Deglutition was very difficult, and little more than fluid food could be got down.

Mr. Moore told the man that, although the disease had gone on to a degree which was well nigh hopeless, he thought it possible to arrest its progress, and at any rate to relieve much of the pain and salivation which it produced. He accordingly began the treatment October 18, by placing a ligature on the right lingual artery, and by dividing the right gustatory nerve. An attempt to secure the facial artery in the same small wound by which the lingual was reached, proved unsuccessful. Before the patient recovered from the chloroform sleep, some acetic acid, diluted with three parts of water, according to the plan proposed by Dr. Broadbent, was injected by about ten punctures into the cancerous mass beneath the tongue, and especially on the right side, as well as into the outer gum.

The result of the division of the gustatory nerve was immediate. The usual injection of morphia after the operation was not needed. The pain in the tongue and temples was removed, and the salivation much lessened; and it was afterwards ascertained that there was absolute loss of sensation on the right half of the front of the tongue; the anæsthesia ended precisely at the mesial line. This effect of the division of the gustatory nerve was important, both as showing that the irritation propagated to the temple and salivary glands by the fifth nerve was not derived from the cancerous jaw, but from the area of the gustatory, and it justified the decision of practicing the operation only on the right nerve, although the disease was not limited to that side of the mouth.

On the third and fourth days following the operations there arose pain in the neck, from swelling about the lower wound, and also behind the last molar tooth, where the nerve had been divided. From both causes, swallowing became uneasy and difficult. There was, moreover, some inflammation of the front of the mouth, in consequence apparently of the numerous injections of acid which had been made.

On October 24 the swelling of the neck and the soreness in swallowing had diminished, and the patient felt better. There is yet, however, no perceptible change in the state of the cancerous growths.

In the same journal, a case of cancer of very large size occupying the side of the face and neck, in the Marylebone Infirmary, under the care of Drs. Broadbent and Randall, is reported. The case illustrates chiefly the destructive effects of acetic acid injections on malignant tumors of large size and rapid growth; but it is not without instructive suggestions on other points, such as the limitation of the action of the acid to the cancerous structure. In a case of this kind absorption was not to be looked for, and necrosis was the result expected. The amount of destruction, however, which followed the first injection astonished all who were watching the case. Equally remarkable was the slight amount of suffering attending the process. The absence of fetor noted is characteristic of this process of treatment. One of the dangers to be anticipated in a tumor of this size in this situation is hemorrhage, but the acid seems to spare the vessels; and as those at first exposed in the neck are now hidden by granulations, there is much less ground for apprehension

on this score. As to the future prospects of the patient, the tumor is now limited to the face, in the bones of which it apparently took its rise, and it will be difficult to eradicate the disease at this part, especially as the acid cannot be retained in the morbid structure in any considerable quantity. Further destruction of skin would be undesirable, and to avoid this the later injections have all been made from the wound, which facilitates the escape of the fluid. Up to the present, the treatment is gaining considerably on the disease, and while this is the case, the present cautious mode of proceeding will be persevered in; but, if necessary, more energetic measures can be taken. On the whole, it seems probable that the old woman's life will be prolonged by the treatment, and that it will diminish her aggregate of suffering.

At a meeting of the London Pathological Society, October 16, Mr. Moore stated that since he had heard Dr. Broadbent's paper read at the British Medical Association, he had treated three recurrent cancerous tumors by the injection of acetic acid, and the result was that they disappeared—not a trace of them being left. The injection was only practiced once, there was but one outward puncture, but the fluid was sent to different parts of the tumor by altering the direction of the point of the syringe. He also exhibited a cancerous tumor which had been injected after removal; it was reduced to a brownish, stringy pulp, in which pools of oil floated. Under the microscope, scarcely any fusiform cells were to be found. There were, however, corners and angles of cells and pus corpuscles, granular masses and abundance of fat.

Mr. Power mentioned two cases in which this plan had been tried; he knew the result of one only—a malignant growth of the eyelid—the tumor rapidly vanished, and he believed that the injection had really cured the disease. Dr. Broadbent's treatment of cancer has been arrived at from reasoning on the nature of malignant growths, and from the known action of reagents on their elements. What on a small scale acetic acid does to cancerous cells on a microscope slide, its injection, he hopes, may accomplish on a large scale in malignant growths. Whether the plan will bear the test of large experience remains to be seen. It has been scientifically conceived, and, applied thus far, is reasonable, and deserves a fair trial.

Acetic, citric and carbolic acids have for several years past been used as external applications, with alleged success, in the treatment of cancer. (See THE JOURNAL, vol. iii., 1866, p. 304.) In *The British Medical Journal*, April 21, 1866, Dr. J. Barclay, of Banff, N.B., states that, having seen in a newspaper an account of the wonderfully beneficial effects of citric acid as a remedy for cancer, he was induced to try it in a large and excessively painful cancerous tumor of the neck, behind the angle of the jaw, which, from its size, situation and extent of attachments, held out no hope of successful removal by the knife. He applied a lotion of a drachm and a half of the acid in eight ounces of water, with the effect of immediate relief of pain, and considerable improvement in general condition. It then occurred to him, remembering the solvent power of acetic acid over cancer-cell walls, to try the effect of that acid. The result in two cases—the one referred to above and a cancer of the breast—was that not only the general health but the appearance of the sore improved considerably; pain ceased, the thick, serrated

and everted edges were thinner, softer, and with less induration about them; all fetor disappeared, and even attempts at cicatrization began to take place.

Carbolic acid was now tried in the above two cases, and in two others, one cancer of the uterus, the other mammary schirrus. The immediate results were even more favorable than those produced by either citric or acetic acid. Dr. Barclay's conclusions were that the three acids have about equal power in allaying pain in cancerous growths; that carbolic acid corrects rapidly and effectually the offensive fetor of cancerous discharges; and they all have a solvent effect on cancerous tissues—the citric acid least, the acetic next in degree, and the carbolic the most powerful. It may be stated that Dr. Broadbent tried the subcutaneous injection of carbolic acid, but was obliged to abandon it on account of the irritation it caused. Dr. Barclay's formula for carbolic acid is: R. Acid. Carbolici, f ʒiss.—ij., Spr. Vini rect. f℥j., Aquæ, ad ℔s. ij.

In the *London Lancet*, March 24, 1866, there is a report of a case of cancer of the tongue treated by citric acid, by Mr. C. J. Derny, in which the excessive pain, which chloroform and opiates had failed to relieve, was allayed by a solution of citric acid—ʒj. to f℥viij. of water—and the patient made quite comfortable. Mr. Derny mentions two cases of cancer of the breast and one of the uterus treated in same way, and with immediate relief of the pain.

In the *Edinburgh Medical Journal*, 1857, it is stated that Professor Simpson had lately removed some tumors—fatty, cancerous, etc.—by injecting, through a slender, hollow acupuncture needle, a few drops of a solution of the sulphate or chloride of zinc, iron, creasote, etc., to destroy their vitality, the tumor itself being subsequently thrown off by the process of spontaneous enucleation. He suggested, too, that "some ingredients, when thus applied directly to the internal structure of tumors, may destroy their specific, without destroying their general vitality; and others lead more directly to absorption, by being brought into contact with the deposits that require to be absorbed."

2. *On the Employment of Galvanism in Promoting the Cicatrization of Sluggish Sores.* (London Lancet, July 28, 1866.)

Mr. Nunn, of the Middlesex Hospital, reports four cases, in which the interrupted galvanic current was used with advantage, healthy action following its application. He has not found, in treating chronic ulcerations, that it is of moment whether the continuous or interrupted current be employed. He says that he has often used Pulvermacher's galvanic chain in obstinate sinuses with advantage.

3. *Ligation of Arteries with Silver Wire in Aneurism.*

In the *New Orleans Medical and Surgical Journal*, September, 1866, Dr. C. H. Mastin gives a case of successful ligation of the external iliac artery, for a large fusiform aneurism in the left groin, in which he used silver wire, No 32, of the silversmiths' gauge. The artery was tied. June 6th, 1866, half an inch below the bifurcation of the common iliac. The wire was secured by a double knot; the ends, cut close to the knot, were bent down and returned into the cellular sheath. Dr. Stone, of New Orleans, tied the common iliac,

in 1859, with a silver thread; but the patient dying on the 26th day after the operation, from some disease of the bowels, the result of the method could not be ascertained.

Mr. Pollock, of St. George's Hospital, London (The Lancet, September 22, 1866), tied, September 14th, 1866, the external iliac artery, for an aneurism of that vessel, with a silver wire. The patient died, on the 17th, from bronchitis. At the autopsy there was found a tubular dilatation of the whole calibre of the external iliac, just at the point where it becomes femoral. The aneurism was about the size of a peach, and on its lining membrane there was a considerable deposit of laminated fibrin, while its centre was occupied by a clot about an inch above the aneurism; the vessel was tightly embraced by the silver ligature, which had not cut through or destroyed the coats of the vessel; between the ligature and the aneurism, as well as above it for some distance, there was a decolorized clot, partially adherent to the lining membrane.

On the 28th December, 1865, Mr. Holmes, of the same hospital, tied the femoral artery, in Scarpa's triangle, with a silver wire, for a popliteal aneurism, the man recovering, and able to do subsequently heavy work.

4. *An Operation for the Correction of Inversion of the Margin of the Eyelids, connected with Shortening of the Palpebral Fissure, by the Implantation of Integument behind the Outer Portion of the Upper Lid.* By David Prince, M.D., of Jacksonville, Ill. (American Journal of the Medical Sciences, Oct., 1866.)

From a point in a line passing horizontally through the external canthus, and about the sixteenth of an inch from the natural position of the canthus in relation to the cartilage, carry an incision downward and inward from one-third to one-half the length of the lower lid, and parallel with its ciliary margin. Make another incision, beginning at a point in the same horizontal line, about one-fifth of an inch further out, cutting downward and inward, and meeting the other incision at its lower extremity. If the incisions are made by a narrow-pointed bistoury, piercing the skin and cutting from within outward, it is best in making the second incision not to bring the point of the bistoury out in the lower end of the first incision, lest the skin should slide over the edge of the knife, by which the flap might be rendered too short. The integument, between the incisions superficial to the orbicularis, is then dissected up as a triangular flap, beginning at the apex below. The flap is then turned up, and its apex is transfixed with a needle attached to a silver wire having also a needle upon the other end. This affords a convenient means of holding up the flap. Care should be taken here, as in all cases where it is expected to escape suppuration, to avoid contusion of the flap by the pinch of forceps. It is better not to use forceps at all in this operation, but to lift the point with a tenaculum, and as soon as sufficient integument is raised, to transfix the flap with the needle, which affords an adequate handle to it. Then, under the base of the elevated flap, an incision is carried in the horizontal line through the canthus, deep through the fibres of the orbicularis muscle to the upper end of the outer incision. The mucous membrane is then freely incised behind the outer portion of the upper lid, so

as to permit the easy elevation and eversion of the lid. The flap is then doubled upon itself, and drawn under and behind the outer portion of the upper lid, being drawn into its new position by the wire suture previously introduced through the flap. To this end the points of the needles are introduced behind the outer portion of the upper lid, and brought out through the integument beneath the brow; the entrance of the needles being about a quarter of an inch apart, care should be taken to introduce both needles into the interval made by the internal dissection, that is, between the lines of the undisturbed portions of mucous membrane. The object of this caution is to secure the contact of the areolar surface of the flap with areolar tissue behind the lid, in order to make union possible. The inverted integument thus comes to occupy the position and to perform the function of mucous membrane. The wire is twisted over a compress for the protection of the skin from ulceration, and it is left in five days or longer. For the extraction of the silver suture, it is convenient to have put a thread into the loop before drawing it in. After cutting the free ends of the loop upon the skin below the brow, a gentle pull upon the thread, which hangs out at the canthus, readily extracts the loop in the direction contrary to that in which it had been introduced. The two lines bounding the excavation, from which the flap had been taken, are made to meet by a little dissection under the margins, and retained by interrupted sutures.

The nearness to the margin of the lower lid to be observed in making the first incision, depends upon the amount of eversion to be secured to the lower lid. If there is no inversion of the lower lid, the flap should be taken from a space more distant, and *vice versa.*

The only deformity which is left by this operation is a somewhat unnatural fullness above the external commissure, which, if desired, can be remedied by a subsequent operation, removing a portion of the integument which had constituted the base of the flap.

It has been suggested that modifications of this method may be resorted to for symblepharon, in order to supply to some extent the deficiency of mucous membrane, by implanting the delicate skin of the lids. This is very distensible, so that though a flap at the time of its implantation may seem very small, it is capable, after its adhesion in its new location, of great enlargement.

To remove any deformity which may arise from the increased thickness, where the flap turns in at either the inner or the outer canthus, the pedicle through which the vascular supply was at first maintained may be cut away, after the circulation is established through the adhesions in the new relations.

5. *Large Growth attached to the Left Vocal Cord—Aphonia of six years' standing—Evulsion—Recovery of Voice.* By Morell Mackenzie, M.D. (London Medical Times and Gazette, October 27, 1866.)

This case is important, as it shows the great value of the laryngoscope in diagnosis. This instrument will have an influence on the treatment of laryngeal disease similar to that which the ophthalmoscope has on the treatment of defects of sight due to changes in the deeper parts of the eye. Both have done much good by restraining routine treatment. In the following

instance the laryngoscope led to a happy surgical procedure, which, without this instrument, could never have been thought of, even if the diagnosis of a growth in the larynx could have been made.

The patient was a woman, æt. 31, who had lost her voice in 1859; all treatment had failed to restore it. In June, 1865, on making a laryngoscopic examination, an irregular lobulated growth about the size of a sparrow's egg was seen to be attached to the entire length of the left vocal cord; it projected up into the laryngeal cavity, and across the glottis. At the patient's second visit Dr. Mackenzie first attempted to seize the growth with his tube forceps, and on the first trial a large piece was seized and brought away. On several other occasions fragments were removed, but at several visits the attempts to seize the tumor were quite unsuccessful. On account of the distance at which the patient lived she was not able to attend at all regularly, and long intervals often intervened between her visits. Accordingly, it was not till March 7, 1866, that Dr. Mackenzie succeeded, with a pair of ordinary forceps (opening in the anterior posterior direction), in completely clearing the larynx. Dr. Pratt was present on this occasion, and made a laryngoscopic examination, both before and after the removal of the last piece. The patient attended twice at the hospital afterwards, and the larynx was seen to be perfectly healthy. The voice was clear and natural. A portion of the growth was examined by Dr. Andrew Clarke, and pronounced to be "an ordinary cauliflower or warty growth."

6. *Case of Excision of a part of the Spinal Accessory Nerve for Spasmodic Wry-Neck.* By Campbell de Morgan, F.R.S., Surgeon to the Middlesex Hospital. (British and Foreign Medico-Chirurgical Review, July, 1866.)

A healthy laboring man, æt. 32, was crushed—Oct., 1860—by the weight of a heavy ladder, the head being bent under it, but no particular injury appeared at the time. Twitchings in the neck came on two months afterwards, at first occasional, but soon more powerful and continuous. Jan. 29, 1861, his appearance was peculiar: a worn and anxious countenance, changing to a sardonic smile from spasm of the facial muscles; eyes constantly twitched towards the right, and could be only fixed by an effort for a short time; head spasmodically drawn to right side, and right shoulder raised towards it; rotation of the head, the chin being turned towards the point of the right shoulder, with the face looking directly over it, the spasms being at times so violent as to draw the chin behind the line of the shoulder; the sterno-mastoid and trapezius muscles were thrown into strong relief during the more violent spasms; the right shoulder on a higher level than the left, but the spine was straight. By a strong effort, and aided by the pressure of his hands, the man could nearly bring the head into its natural position; but this was always followed by violent spasms. Any attempt by others to restore the head to its natural position was followed by violent and insupportable muscular action in the neck. During the paroxysms there was very great pain, and he was never free from discomfort. During sleep the head was sometimes though rarely quiet, and in the natural position; it was generally twisted round, and at times the spasms came on so as to awaken him or prevent sleep.

There was no appearance of injury or disease about the spine. Pain was

complained of down the back, but there was no particular tenderness in any part of it. General health impaired by suffering and loss of rest. No special point of irritation, which might, by reflex action, give rise to the spasms, was found. It was believed that the spinal accessory nerve, the abducens oculi and some of the branches of the first and second cervical nerves, were principally involved in their production. Whether they were reflex actions from some deep-seated irritation, perhaps within the spinal canal, or were set up by direct irritation in the nervous diseases, could not be determined. The former view seemed the more probable.

After all medical treatment failed, it was determined to divide the sterno-cleido-mastoid muscle. The muscle united quickly, and the spasms recurred with as much violence as before. The man's health giving way rapidly, division of the spinal accessory nerve and removal of a portion of it were done, with a view of paralyzing the united action of the sterno-mastoid and trapezius muscles, thinking that the action of the antagonistic muscles, even if persistent, might be controlled. The operation was performed February, 1862, with little difficulty. An incision, two inches long, was made along the posterior border of the sterno-cleido-mastoid muscle, the centre of the incision corresponding to about the centre of its edge. The fascia being slit up to the same extent, the trapezial branch of the nerve was sought for as it emerges from the muscle to cross the posterior triangle of the neck, and found a little above the centre of the incision. It was traced through the fibres of the muscle—the fibres being cut through as in an ordinary dissection—until the common trunk, above the division into the trapezial and sterno-mastoid branches, was reached, and here a piece, about a quarter of an inch in length, was cut out. On recovery from the effects of chloroform, there was total paralysis of the trapezius and sterno-mastoid muscles, and though there was still an occasional and slight convulsive movement of rotation of the head, it lay on the pillow in almost a natural position. There was no tendency to undue action of the corresponding muscles of the opposite side. The respiration was not affected, and no peculiar sensation was felt. The wound healed without trouble. When he got up the head maintained nearly its natural position, and did not require any special support. There was still some slight action of the rotatory muscles of the head. The sterno-cleido-mastoid and trapezius remained perfectly flaccid, except at the back and upper part of the clavicular portion of the former muscle, which was tense, and evidently acted when an attempt was made to bring the right ear down towards the shoulder. The man was discharged from hospital, May, 1862, and resumed work as a laborer, having regained flesh and strength.

Condition, January, 1865: looking healthy, countenance tranquil, face turned directly forward, with the forehead and chin in a perpendicular line. Occasionally, and for a few seconds, there was a trifling twitch of the head towards the right side, with a little movement in the eyes; this could be brought on by any sudden twitch or excitement. The right arm hung listlessly against the side. The body was a little deflected from the perpendicular, owing to an uniform and trifling arching of the spinal column, the concavity being directed towards the left. No indication of a double curvature. The right sterno-mastoid muscle was completely wasted, except at its upper and posterior part, where, for the breadth of half an inch, extending

from behind the mastoid process to the middle of the posterior border of the muscle, it was nearly as large as on the opposite side. The trapezius was entirely wasted; a lamina, not thicker than a shilling and quite flaccid, could be felt in the neck, with no contraction. The right shoulder, when raised, appeared fuller than the left. The right arm and forearm were as powerfully developed as the left. The deltoids and serrati were equal on the two sides. Respiration and sensibility natural.

Mr. Morgan observes with regard to the operation: "The point at which the trapezial branch of the spinal accessory emerges from the sterno-cleido-mastoid muscle varies to the extent of an inch or more; but it can be readily found by exploring the edge of the muscle, and can then be easily traced back to the common trunk. There would be far more difficulty in finding the trunk by section through the upper part of the muscle, for its situation is variable, sometimes lying deep within the muscle, sometimes upon the inner surface." An attempt to reach the nerve by subcutaneous incision would, he thinks, be hardly advisable.

This case being, it is believed, the only instance of resection of the trunk of the external branch of the spinal accessory, it is interesting in a physiological as well as surgical point of view.

7. *Acute Osteo-Myelitis following Amputation of the Forearm—Secondary Amputation of Humerus—Fresh Osteo-Myelitis—Third Amputation at the Shoulder Joint—Recovery.* By Prof. J. Fayrer, M.D., of Calcutta. (London Medical Times and Gazette, July 14, 1866.)

Prof. Fayrer remarks that this case is of great interest in a pathological, as well as surgical, point of view: "It illustrates what I have so frequently pointed out as the great tendency here, on the part of bones, when divided, to take on an unhealthy action, to pass rapidly into a state of suppuration, involving the whole of the cancellated structure, and rapidly inducing constitutional mischief, which, if not checked by the removal of the affected bones, is likely to terminate fatally by toxæmic changes. This form of diffused osteo-myelitis may occur, as the case proves, whilst all around it is doing well. In each of the instances in which it occurred in this case, the soft parts of the stump were doing so well as to have almost healed. It will be observed that the symptoms indicating the disease in the bone were not the immediate or direct sequel of the operation, but supervened at a period of several days later, when the general condition of the patient was favorable. They were ushered in by violent rigors and consecutive sweats, with rapid pulse and hurried respiration. Amputation on each occasion was performed as soon as the symptoms had fully declared themselves, and fortunately in time to anticipate any of those structural changes in the lungs which experience has taught us are but too certain to follow when the source of the mischief cannot be removed. It is very satisfactory to see how perfectly successful the last operation proved, notwithstanding its magnitude, the weak condition of the patient from incipient blood-poisoning, loss of blood, and the shock of former operations; and it seems to me to prove that disarticulation is often safer than amputation through the bones, where it can be practiced. For here, after two amputations in the same limb, performed through the continuity of the bones, osteo-myelitis followed each. The

third operation, disarticulation at the shoulder joint, proved successful. It is probable that had I amputated at the elbow joint, instead of just above it, on the first occasion, when osteo-myelitis appeared, the patient might have been spared the necessity of an operation subsequently at the shoulder joint; but I thought that cutting through a part altogether sound, and above the next joint, would probably result more favorably, and hoped that osteo-myelitis would not attack the sound bone, and accordingly I amputated above the joint. I now feel so satisfied of the advantages, in a pathological point of view, of amputation at the joint, over that through the shaft of the bone, that I shall hesitate on any future occasion to cut through a bone when there is a joint near the injury at which the limb may be divided. Such a rule cannot, of course, be made absolute; but I suspect if it were of more general application, the mortality after amputation would diminish. Imperfect hospital construction and local hygienic defects have, no doubt, much to say to it, but cannot be the sole causes. The question still requires further investigation, and I am convinced that if a section were made of the bone of every amputated limb, and the lungs and other viscera examined in fatal cases, it would be found to be a more frequent cause of mortality than is, perhaps, supposed. I now feel better able to account for the loss of many amputations in field service, where death was attributed, sometimes, perhaps, rather vaguely, to other and uncertain causes. Were all such to be carefully examined, and the same minute inspection made as that practiced more than twenty years ago by the pathologist, who threw the first real ray of light on the cause of death after surgical operations (I need hardly say I refer to Dr. N. Cheevers), I feel certain that suppuration in the bone would be found to take a higher place as a cause of the blood-poisoning, surgical fever, or pyæmia—call it which you will—which raises the death figure of surgical operation statistics so high. No one can read the report of M. Roux's experience and practice in the St. Maundrier, at Toulon, without feeling that this may be the case; and I am sure that no one can witness what occurs there, without feeling that his experience must lead him to opinions similar to those of the eminent French surgeon, and suggest similar practice. I can most conscientiously say that I had arrived at and recorded similar views before I had either heard of or seen his report. My experience of seven years in this great Surgical Hospital has not only led me to, but has confirmed me in them."

8. *On the Reduction of the Subcoracoid Dislocation of the Humerus by Manipulation.* By Alexander Gordon, M.D., Professor of Surgery, Queen's College, Belfast. (British and Foreign Medico-Chirurgical Review, October, 1866.)

The following simple, easy, and effectual mode was successfully tried in nine cases. If the right shoulder is dislocated, the patient is placed on his back, with the shoulders raised. The operator, standing on the same side and raising the elbow, grasps the lower end of the right humerus, the thumb on the inner with the fingers on the outer side, the forearm lying flexed at an acute angle, resting on the web between the thumb and fingers. He raises the arm upwards and forwards, so as to place it at right angles with the surface on which the patient is lying, the patient being told, at the same

time, to let the limb be supported entirely by and rest upon the left hand of the operator, who, with his right hand, feels for the head of the dislocated humerus, and presses it downwards and outwards, either through the anterior wall of the axilla or in the axilla, moving, at the same time, with his left hand, the lower end of the humerus upwards and backwards, with rotation chiefly inwards. At this time occasionally a snap or jerk is felt, caused by a change of position in the head of the bone, for, on depressing it, it is freed from the coracoid process, and the supra and infra spinati muscles, being on the stretch, jerk it outwards to the anterior border of the glenoid fossa. When in this position, with the fingers in the axilla, almost the whole of the upper articular surface of the humerus can be felt, which should now be pressed outwards and forwards; in other words, the head of the bone is lifted over the inner margin of the glenoid cavity—the left hand assisting by rotation and very slight extension when necessary—which it enters with a distinct snap.

This manipulation consists of three steps. (1.) Elevation and adduction of the arm, the forearm being flexed. (2.) Depression of the head of the bone, and freeing it from the coracoid process. (3.) Lifting and pushing the head of the humerus forwards and outwards, so as to enable it to rise over the inner margin of the glenoid fossa.

Dr. Gordon is convinced that this method will be found almost as successful in other varieties of dislocations of the humerus. In two cases, where the head of the bone lay internal to the coracoid process, and almost an inch below the clavicle, he raised the arm and depressed the head of the bone. It was deeply lodged in the subscapular fossa, though not so low as the lower margin of the glenoid fossa. Neither by pressing the elbow outwards with the left hand, nor with the right in the axilla, could the head of the bone be sufficiently raised to free it from the inner margin of the glenoid cavity. An assistant was directed to pull gently upon the arm, and very moderate extension permitted the head of the bone to be raised and put into place.

Dr. G. believes that the resistance to reduction is due rather to the fibrous structures than to muscular tenacity.

9. *Fracture of the Internal Condyle of the Femur.* (The American Journal of the Medical Sciences, Oct., 1866.)

A case of this rare accident is reported by Dr. E. M. Curtiss, of Brasher Falls, New York. The man was thrown from his carriage, striking on his right heel, the limb going between the tug and the thill, the body bending inward under the horse, which trampled on him. There was severe pain in the knee joint, and upon attempting to step upon the right foot the limb bent inward; crepitus on pressure; swelling great, with much tenderness, and some ecchymosis on internal aspect of knee joint. Treated in fracture box, with compresses underneath and internal to the fractured condyle. On 18th day the limb was strapped and placed on a double inclined plane, with side pieces for the femur; knee bent to an angle of 165°, and kept so for half an hour. The limb was bent more and more daily, and kept so as long as patient could bear, to June 7, when the patient could flex it to an angle of 95° without the aid of a splint, and on that day he walked with crutches.

Aug. 25. walked with aid of a cane, and the knee could be bent to something less than a right angle—the joint larger than the left.

Hamilton (Practical Treatise on Fractures and Dislocations, 3d Edition, 1866) reports two cases.

10. *Reduction of Dislocations of the Femur by Manipulation.* (British Medical Journal, Nov. 3, 1866.)

Mr. JOHN BIRKETT reports sixteen cases of luxation of the hip-joint which he reduced at Guy's Hospital, by manipulation, without the aid of pulleys, during the last eighteen years. Of these, six were on the dorsum ilii; five into the ischiatic notch; four into the foramen ovale; and one on the ramus of the pubes. Chloroform was used in all the cases.

11. *A New Operation for the Radical Cure of Hernia.* By ARTHUR E. DURHAM, F.R.C.S., Assistant Surgeon to Guy's Hospital. (London Lancet, June 16, 1866.)

The man, æt. 26, had an easily reducible but very troublesome right inguino-scrotal hernia, of six years' duration. At the time of admission into the hospital, the tumor was somewhat larger than a hen's egg. No truss could be worn.

On January 19th, 1866, chloroform having been fully administered, and the hernia reduced as completely as possible, Mr. Durham proceeded to operate in the following manner. An incision about two inches and a half in length was made through the skin and superficial fascia, in a direction at right angles to Poupart's ligament, and just over the inner border of the internal or deep abdominal ring. The tendon of the external abdominal oblique muscle was next divided in a similar direction, but to a somewhat less extent, and in a situation slightly further from the median line of the body. The lower fibres of the internal abdominal oblique or cremaster were then separated longitudinally, and the internal spermatic fascia or fascia propria of the hernia was exposed. A slight incision having been made in the lower and deeper part of this fascia, an aneurism needle was carefully insinuated through the areolar tissue, and by its means a ligature was placed between the sac of the hernia and the important structures of the spermatic cord, and carried through the upper and deeper part of the fascia. The fascia and sac were then drawn gently downwards and towards the median line of the body, and the ligature was tied tightly as high up and as far outwards as possible —in fact, as nearly as could be judged, exactly at the internal or deep ring. The ligature thus included the greater part of the circumference of the fascia propria or internal spermatic fascia just where it becomes continuous with the fascia transversalis, the whole circumference of the sac just at its junction with the general peritoneal lining of the abdominal parietes, and within the sac a small plug-like portion of omentum. In passing the aneurism needle, a slight puncture was unintentionally made into the sac. This puncture, however, when subsequently dilated, afforded the opportunity of ascertaining that the sac did not communicate with the tunica vaginalis testis, but that it contained a small piece of irreducible omentum; this was drawn out and cut off below the ligature. Finally the wound was closed above and below by

sutures, which were passed through the sac. The ends of the ligature were left coming out through the middle of the wound.

The after progress of the case was most satisfactory. The patient was kept absolutely in the recumbent position for more than six weeks. From first to last he never had a single bad symptom worth mentioning. There was never any abdominal tenderness, constitutional disturbance, or other indication of general peritonitis; nor was there ever much pain about the site of the operation. The upper and lower parts of the wound healed by first intention. The ligature came away on the eighteenth day, and complete closure of the wound speedily followed. On the 29th March, the patient, having to a certain extent recovered his strength, went into the country. Before leaving the hospital he was examined by all the members of the surgical staff, as well as by many visiters. There could not be discovered the slightest hernial protrusion, nor any abnormal impulse on coughing. The inguinal canal from the internal ring seemed perfectly blocked by the obliterated sac and new material.

This case, although a solitary one, may be considered to prove—first, that the method of operation described is practicable; and, secondly, that it is not necessarily attended by danger. The author would add that he believes it to be more scientific in principle than any other method yet adopted, and he hopes therefore it may prove more successful in practice.

The case was reported at the meeting of the Royal Medical and Chirurgical Society, May 8th. In the conversation which followed, Mr. Spencer Wells remarked that when, in 1854, he brought Wutzer's operation before the Society, all operations for the radical cure of hernia were generally condemned by the profession. Since that time the operation had been frequently performed in London, and had often proved unsuccessful. This was because it was done in cases for which it was unsuitable. It was, unfortunately, applicable to a small number of cases only—those in which the rings have not been much widened and the canal not much shortened; in such it was very successful, and almost free from danger. Mr. Wood's operation he thought of much wider application, but it is a more serious, not to say dangerous method. Mr. Durham's operation seemed to him to be still more hazardous. It was a question whether any serious operation was justifiable in a reducible hernia.

Mr. Holthouse thought the new operation inferior to Mr. Wood's, partly because it was less safe, and partly because it dealt only with the hernial sac, and made no provision for drawing together the sides of the canal. Mr. Wood's operation blends the sac with the walls of the canal, which thus offers a firm resistance against future protrusion.

Mr. Kingdon said that it was not the fatality of former operations which led to their abandonment, but their inefficacy. Sooner or later the adhesions were sure to yield; such was the recorded evidence of Scarpa and Dupuytren.

Mr. Durham replied that the operations most similar to his own were Langenbeck's and Smucker's; here the ligature was applied at the external ring, which at best would convert a scrotal hernia into a bubonocele. Wutzer's operation had been proved to be worse than unsuccessful, and was unscientific in principle. Mr. Wood's method was injurious, but from his own

statement of the sixty patients operated on, between forty and fifty were wearing trusses, and in only six or seven had trusses been dispensed with. He believed that meddling with the peritoneum was much exaggerated. The statistics of operations for strangulated hernia were very bad; a large proportion of cases where the sac was opened proved fatal. In his operation he attempted to do intentionally what Mr. Wood only did accidentally—close the sac at the internal ring.

In *The Lancet*, June 23, Mr. John Wood—not present at the meeting—makes the following statement concerning his operation: "I have now performed my operation in upwards of 160 cases, chiefly (and almost weekly) in the theatre of King's College Hospital, where they may be followed out by any one interested in the matter. Out of this number I have had *only one* death (viz., the case of pyæmia detailed in my work on Rupture). Serious symptoms of any kind are now so rare as at once to excite remark. This rate of mortality no competent and candid judge will consider worthy of being entitled as 'dangerous,' even in an operation of *expediency*, as distinguished from one of *necessity*. In the practice of other surgeons, I have seen or heard of a fatal result in three instances. In these, the causes of death (as in most cases the causes of failure) have seemed to me so clearly apparent, and so perfectly avoidable by skill and practice, that I am led to consider them useful as warnings, but by no means as constituting a valid argument adverse to the operation. The six cases referred to as the *only* ones treated by me *entirely without truss*, were so treated as experiments to test the reality and efficiency of the results obtainable by operation alone and unsupported, and in this they were successful. This, however, by no means justified one in discarding the prudence of a light truss support for a short time after the operation, to afford the new adhesions time and opportunity to contract and strengthen. So far as an earnest desire to get at the truth has hitherto enabled me to attain it, I find that the proportion of my success is from 65 to 70 per cent. The subject of one of the largest ruptures I have met with, who was operated on nearly five years ago, and has since done continuous hard labor as a porter, without truss, for the last two or three years, was shown at King's College Hospital last week, *quite free from protrusion*. Others equally satisfactory have been there exhibited from time to time, as the frequenters of the hospital well know. I must needs claim for my method of operating the power of placing the ligature not 'accidentally,' but at the pleasure of the surgeon (well skilled and experienced), quite as close to the deep opening of the rupture, more safely, and quite as completely, as by the plan described by the author of the paper."

In *The Lancet*, September 22, 1866, Mr. Wood reports a case of fatal peritonitis, after his operation for the radical cure of hernia. The subject was a healthy lad, æt. 7, who had a congenital direct left scrotal hernia, as big as a man's fist, with a large, lax abdominal ring, opening above the pubes, and a thick and abundant sac. It was easily reduced, but redescended whenever he walked about, in spite of all the trusses that had been tried. The operation with pin and wire was done on the 7th June; on the 17th both punctures had entirely healed, a truss was applied, and the child got up and played about. After some days it was found that the rupture again protruded a little more than half the size it was before. On the 29th, a

second operation was performed with wire, for the purpose of closing the neck of the sac and hernial opening more completely. In doing this it was found that the excessive induration and toughness of the sac and the great contraction of the hernial opening consequent upon the first operation rendered it very difficult to pass the needle through, and to adjust the wire properly at the pillars of the ring. On the next day there was a sudden fall in the temperature. On the 2d of July the boy complained of pain in the abdomen, and there were tympanitis and tenderness on pressure. The pad and bandage were removed, and the wires untwisted and cut short, and all tension removed. The symptoms of peritonitis were developed, and the patient died on the 4th. The autopsy showed general peritonitis. The colon in contact with the hernial opening free from injection or adhesion; a small fibre of recent lymph closed the entrance to the sac, which was empty and contained no fluid. The autopsy showed that the peritonitis commenced at and spread from the inflamed knuckle of bowel near the cæcum in the right iliac fossa, and not from the sac of the hernia, nor from any of the parts complicated in the operation. The congested loop of ileum, although only twelve inches distant from the cæcum, had apparently been incarcerated in the sac of the hernia at no distant period, probably between the two operations, when the rupture descended under the truss pressure. At this time, most likely, the inflammation had been set up in its substance, and upon its return into the abdominal cavity at the time of the second operation had spread to the whole peritoneum. This was possibly mainly caused, or, at least, aggravated, by the unhealthy state of the ward, as shown by the serious symptoms occurring at the same time (from pyæmia and erysipelas) in other operation cases. The rapidity of the disease, the discoloration about the joints, the hepatization of the right lung, and the clots in the heart and aorta, point also to the presence of morbid blood-changes in the system.

This being the second fatal case reported by Mr. Wood after his operation, it makes the percentage of deaths in his practice about one and a half during eight years.

Dr. David W. Cheever, of Boston, reports (*The Boston Medical and Surgical Journal*, July 5, 1866) the results of twenty cases of the operation for the radical cure of hernia by Mr. Wood's plan done by him. They are as follows: Recent operations, 2; operation abandoned, 1; cases lost sight of, 2; successful, 3; failures, 12. Dr. Cheever says: "Of the twelve failures, four were cases that should not have been operated on; two on account of great obesity; one, because the rupture was direct and the result of laceration; one, because the ring was too small to properly admit the finger. Deducting these four cases, and deducting also the first five on the list, where the operations were recent, abandoned, or lost sight of, and we have left *eleven* fair, average cases—of these, three were successful, and eight failed. This gives a ratio of success of twenty-seven per centum, whereas Mr. Wood claims seventy per centum of success in a total of 150 cases. I think there can be no doubt that this operation is based on the most correct anatomical principles, and is the most thorough of any proposed. If this will not produce a radical cure of hernia, there is but little prospect that any of the other operations will do so. It would seem to be a safe operation. In our

twenty cases we had no peritonitis, and no death. This operation palliates, if it fails to cure. It renders an uncontrollable hernia controllable by a truss, in many instances. It tends always to reduce the size of the rupture, and it gives nature a chance to restore the parts by retention and adhesion. It will cure some adult cases, but they must be cases selected with care and judgment. It will fail to cure some adult cases. It affords the best chance of a perfect cure in children from six to twelve years of age—after the crying and restlessness of infancy and the first dentition are over, and during the formative period before puberty. Nature then tends to close the rings, and the adhesive inflammation set up by the operation, even if but temporary, is of great assistance in furthering this desirable result. Some adults, also, are undoubtededly eventually cured by hard truss pressure, on the principle formerly advocated by Heber Chase. But the chances of cure by truss pressure alone are far less in adults than in children. This operation of Mr. Wood has not been many years before the medical public. Time alone can fairly test it. It is very certain that we have seen absorption in some cases at the end of four and six months; and in others of a year.

"Having now done the operation some twenty times; having tried all of Mr. Wood's methods, by silk, wires and pins, and also the femoral operation proposed by him, we have preferred to let three years elapse before formally tabulating the results of our operations. Sufficient care, time and labor have been bestowed to guarantee success, if it were attainable in the patients who fell to our lot. Some were improper cases for operation; in some, doubtless, the after treatment was neglected, but others were fair, average cases of rupture in healthy males. We must confess that our success has not equaled that claimed by the originator of the operation. What more experience, judgment or dexterity might effect, we know not."

In a letter from Mr. Wood to Dr. C., received a few months since, he makes the following statements:

"I have now had about 150 cases of hernia under treatment by my operation, of all kinds, young and old, severe and moderate. In nearly all, trusses had been fairly tried; in some, failing to retain the rupture, in the milder cases failing to cure it. All have been urged to let me know if the rupture returned. Of these 150, in 40 the rupture has come back, more or less, but seldom so large as before. Mr. Paget, Mr. Haynes Walton and Mr. Redfern Davis have repeatedly done the operation, with success. It has been done extensively in Liverpool, Dublin, in Berlin by Langenbeck, in India and Australia. Many cases which I show, have been operated on four, five, and six years, and have worn no truss after the first year. One man is continuing the laborious occupation of a market garden porter, without a truss, etc., etc. I have come to the conclusion that in very large and direct cases in adults after forty years, only occasional cures can be looked for, but a diminution of the rupture may be calculated on. In children before puberty, and in young men, the success of the operation is so decidedly superior to the great uncertainty, and, when probable, the slowness of cure by truss pressure, and the symptoms are so slight after the operation, that I should not hesitate in submitting myself or a child of mine to it, rather than endure the inconvenience and risk which a hernia, supported by a truss only, entails. After all, it is an operation of expediency, and liable to all the objections with

which such operations are assailed. No man is justified in pressing it upon his patient. He should lay the facts before him fairly, and leave it to him to decide." We must remember also to tell the patient that he has got to submit to from two to three weeks' confinement in bed, to not much pain, but to weariness from position.

12. *Hemorrhoids and Prolapsus of the Rectum treated by the Screw Clamp and Cautery.* (The Lancet, June 23d, 1866.)

Mr. Henry Smith publishes the details and results of thirty-five additional cases treated by the clamp and cautery, of which 24 were of hemorrhoids, with 1 death, and 11 of prolapsus, and no deaths. The fatal case died of malignant tumor, involving the colon and bladder, several months after being operated on, and which Mr. Smith believes existed previously. He says that he has now operated in all 70 times since he adopted this method, with but one fatal case immediately following the operation, where death occurred from pyæmia, after a combined operation with the clamp and the ligature, and the details of the case, he thinks, clearly point to the ligature as the cause of death. He regards the operation by the clamp and cautery as a safer, a less painful and a quicker method than by the ligature, and the convalescence is shorter. Mr. Smith further observes: "There are one or two points in connection with this operation which require some comment. The absence of hemorrhage in any of the cases detailed, either primary or secondary, is remarkable. I have often been asked whether secondary hemorrhage does not occur. It has never occurred in any single instance where I used the clamp and cautery for hemorrhoids or prolapsus. But I operated on a case of polypus of the rectum, of the most vascular character I ever met with, with the clamp and cautery. The pedicle, which was very forcibly pulled down, and was seated high up, was clamped and cauterized without a drop of blood showing. On the first action of the bowels in three days a considerable amount of blood came away; it was, however, arrested as soon as I saw the patient, by the injection of ice-water, and did not recur. I have been surprised that secondary hemorrhage has not occurred in any of the cases detailed, especially in those instances where the bowels have acted within two days, and where the patients would go out earlier than I wished. In one or two instances patients have disregarded my wishes, and have traveled long distances by railway a few days after the operation, or, as in one case, taken a violent purgative before the wounds were half healed. Considerable suffering has been the result; but, of course, with such neglect on the part of the patient, it is unfair to attribute the evil results to the operation itself. With reference to the occurrence of any stricture of the bowel, or unhealthy ulceration remaining, I have not met with it."

13. *Stricture of the Urethra treated by Holt's Method.* (London Medical Times and Gazette, August 18, 1866.)

Dr. Fayrer, of Calcutta, reports three cases successfully treated by immediate dilatation. In the first case, no bougie could be passed. Holt's director was introduced, and the stricture dilated by No. 9 dilator, and No. 12 catheter was passed afterwards without any difficulty. There was no shivering, but little bleeding, and not much pain. Water voided in good stream. Some fever

for several days. Patient left the hospital in fourteen days, quite cured of the stricture. The second case was complicated with perineal sinuses, which gradually contracted after the stricture had been split, and the urethra subsequently kept dilated. The third case is particularly interesting, as the stricture was very tough, rigid and unyielding, and it required considerable force to pass the dilator through it.

14. *On the Treatment of Severe Stricture of the Urethra by Over-Distension.* By HENRY THOMPSON, F.R.C.S. (London Lancet, June 16, 1866.)

Three years ago, Mr. Thompson placed on record an account of a new method of treating obstinate stricture of the urethra. Increased experience of its capabilities has induced him to describe the principles involved in the procedure, and the details necessary to be attended to in its application. First, there is one very important fact which is in intimate relation with all treatment of urethral stricture, and it has been somewhat overlooked, or, at all events, it has not affected, as it ought, the surgical treatment of the malady. It is this: *that portion of the urethra which is most frequently affected by stricture, possesses in its natural condition a calibre at least double that of the external meatus.* It follows, then, of necessity, that any kind of dilatation of the strictured portion which is limited in extent by the size of the external meatus, does but half restore the natural calibre of the canal. In other words, the external meatus, having in any case a diameter equal to that of No. 12 of the catheter scale, the natural diameter of the bulbous portion will equal at least that of No. 16 or of No. 18, an area more than double that of the former. Hence, if this latter portion becomes the subject of stricture, and the dilatation is carried no higher than No. 11 or 12, the stricture is not more than half dilated. Practically, for the great majority of cases, such dilation suffices for all purposes. The patient loses all his symptoms, and continues well on condition that he keeps open his stricture by occasionally passing an instrument. Happily, ordinary dilatation affects all this for most patients. For a few exceptional cases, however, it is insufficient to relieve the symptoms. The passing of a full sized instrument does not enable the patient to pass even a tolerable stream; it often produces absolute retention, or rigors, or increased pain. For such a stricture we are accustomed to use some more efficient proceeding—*e. g.*, to divide the hardened tissues (urethrotomy), or to burst them at a single operation (rupture). Each proceeding has been, and is, of considerable value when judiciously adapted to the case. By neither of these operations is the urethra restored to its original calibre at the point of stricture. So long as the rupturing instrument, or the dilating instrument, is limited in its size by the calibre of the external meatus, the contracted portion of the urethra is only half dilated. Now, my own experience has convinced me, that, in many of these obstinate cases, an equally perfect result may be accomplished by means of a powerful distending instrument, without any incisions at all. The principle which underlies and regulates this proceeding is that on which I lay some stress, viz., to restore, if possible, the bulbous urethra to its natural size, regarding it as about twice that of the external meatus. In order to effect this purpose, I have designed and employed an instrument which opens the bulbous urethra to more than double the size of the meatus, and acts mainly on the strictured

not on the healthy, portion of the urethra. When closed for introduction, it equals in size about a No. 5 catheter. As many strictures on which it is necessary to act are smaller in calibre than this, it is then essential to tie in a small gum catheter for thirty-six or forty-eight hours before employing it, in order to dilate the stricture temporarily to a sufficient size to admit the instrument. It is assumed, of course, that the stricture has been proved not to be permanently benefited by such (*i. e.*, tying in) dilatation, or the treatment about to be described would not be adopted. However narrow or retractile a stricture may be, it is always possible, by tying in, to dilate temporarily as far as to the required calibre.

The next principle which guides the treatment is this. Experience shows that most living tissues, if over-distended, lose to a great extent their natural elasticity. The distending instrument I employ is composed of two parallel rods, which can be slowly separated by means of a screw in the handle, through the action of two levers which exist between them. In this manner the rods pass gradually and successively through all the numbers of the catheter scale, from 5 to 16 or 18, in obedience to the operator's action on the screw, and an index there marks the rate of movement for his information. When opened, the two blades produce the figure of a very elongated spindle, the centre of which corresponds with the site of the stricture in the urethra. This position is easily insured by means of the graduated scale marked on the stem of the instrument, and a small clamp which slides upon it. If the stricture is five inches from the orifice, this clamp is placed against the figure 5 on the stem, and the instrument is passed until the clamp acts against the external meatus. It is to be carefully maintained in this situation while the distension takes place.

Having so placed the instrument, nothing would be easier than to turn the screw rapidly, and at once raise the calibre of the strictured portion to the required size, say 16 or 18. This would effect its rupture, and is precisely that which I wish to avoid. I occupy from seven to ten minutes in slowly distending the part up to that calibre, and therefore prefer to give the patient the benefit of chloroform. Hence I *over-distend as much as possible, and rupture as little as possible.* The tightest fibres of all alone get ruptured; those which are less rigid yield to the distending force. The more I can accomplish the latter object, the more I avail myself of the principles just alluded to, and deprive the tissues of their elasticity. The more I accomplish by rupture, the more of a wound I produce, and consequently the more fear there is of rapidly returning contraction. Having reached the limit intended, the screw is slowly turned back until the index marks about No. 10, and the instrument is withdrawn. The instrument is designedly not entirely closed. A large gum catheter is passed, and tied in twenty-four hours, a plan which appears preferable, although there is no more occasion to do this than there is after rupture, under which circumstances Mr. Holt dispenses with the catheter altogether. I pass no instrument for two days; then a full sized bougie every day or two, prolonging the intervals, and teaching the patient to do it himself occasionally afterwards.

A few words on the cases in which this proceeding is not applicable, or rather in which other treatment appears to me preferable. For an old and non-dilatable stricture within two or three inches of the meatus, I prefer inter-

nal urethrotomy. It is perfectly safe and easy if performed in that situation. Dilatation and rupture, in my experience, are both inadequate to produce any lasting benefit. I have heard of my mode being tried at the anterior part of the canal. I should not have advised it. The spongy body here is so much less extensible, so little porous, and so greatly fibrous, as compared with its character where it constitutes the bulb, that but small room exists for extension. Hence in part the futility of ordinary dilatation, as well as of overdistension, in this situation.

Again, if a urethra is narrowed at several points—an unusual condition, but nevertheless one which is occasionally met with—I should prefer to adopt Mr. Holt's plan of rupture as, on the whole, the most certain to hit all the points of narrowing.

There remain then all the strictures, forming a great majority, which exist at from four to six inches from the meatus. For these I may say, in one word, that, having employed all the mechanical methods of dealing with them that rest on sufficiently sound principles, or on sufficiently good authority to merit trial, I know of none that has afforded me such good results, both in regard of the immediate object and of the enduring result, as the method I have endeavored to delineate in this paper.

I have applied this proceeding only for the most intractable cases which have come under my notice, having preferred always to employ ordinary dilatation (usually by tying in the gum catheter) when it was possible to accomplish my object by that safe and simple process.

15. *Treatment of Gonorrhœa and Gleet by Soluble Bougies.* (London Lancet, May, 1866.)

Mr. Henry Thompson, of University College Hospital, London, believing that the unreliable action of injections in gonorrhœa and gleet is due to the short time that they are in contact with the inflamed surface, had constructed soluble bougies, two or three inches in length, made of cocoa butter, and medicated with the article to be used—nitrate of silver, acetate of zinc, tannin, etc. They are cast in moulds, are perfectly firm and smooth, and may be used in any length, but that named has been deemed the best. A soluble bougie is equal in size to about No. 8 or 9 of the catheter scale, and may be introduced (having been previously oiled) by the patient himself into the urethra, where the material gradually melts in the space of about ten minutes. The patient is directed to slip one of these bougies into the passage on going to bed. After trying many methods for retaining the bougie *in situ*, Mr. Thompson has adopted the following. A piece of adhesive plaster is cut, nearly an inch wide and five inches long. A piece of Taylor's stout lint, of the same size, is rolled up into a little pad and laid on the centre of the plaster, which is warmed, and applied along the lower surface and dorsum of the penis, the prepuce meanwhile being fully retracted. A second strip of plaster, half the width of the first, is then put closely around the glans penis transversely. The bougies are made to contain either a quarter of a grain of nitrate of silver, a grain of tannin, two-thirds of a grain of acetate of lead, or ten grains of nitrate of bismuth, as astringents; while others are sedative also, and contain two grains of opium, or two of belladonna. Other materials can, of course, be employed. By this plan Mr.

Thompson has satisfied himself that the active agent is kept for several hours in contact with the urethral surface, and is, moreover, necessarily squeezed into the lacunæ, which often, doubtless, escape being acted upon by injections. It is by many supposed that these lacunæ, from harboring the discharge and escaping treatment, are the main cause of the persistence of gonorrhœa. However that may be, there would seem little doubt that this mode of treatment permits the effectual application of the astringent, and thus promises better results than can be attained by the transitory action of an injection.

Soluble bougies may be made by dipping a small wax bougie, to form the central axis, two or three times into a heated mixture of soft cerate, containing nitrate of silver and other articles in proper quantity. Two and a half inches give ample length.

16. *Remarks on the Use of the Endoscope.* By HENRY THOMPSON, F.R.C.S. (The Lancet, October 20, 1866.)

Mr. Thompson has used for nearly four years one of Desormeaux's endoscopes, adopting more recently Dr. Cruise's powerful lamp as the illuminator. He has come to the conclusion that the instrument is of small value in practice as regards diseases of the urethra and bladder. With regard to the urethra the endoscope reveals to the eye certain congested and granular conditions of the urethral mucous membrane, and enables the surgeon to apply an agent to the precise spot so affected. Heretofore it was known that such conditions existed, most commonly in the bulbous parts of the urethra, that the site of the diseased part was fairly appreciable by its undue sensibility when an instrument was passed, and that a cure often rapidly followed the application of a solution of nitrate of silver to the sensitive spot. Increased certainty, both in finding the disease and in applying the remedy, is due to the endoscope.

"Next, with respect to its use in stricture. I doubt the power of the endoscope to reveal the orifice of a stricture through which a good surgeon has been unable with care and attention to pass an instrument. I have long believed, with Syme, that a stricture which admits the passage of urine outward in any quantity, will admit, to gentle and careful manipulation, the passage of an instrument inward to the bladder. It must be a remote chance which grants increased facility of penetrating so minute an opening to the endoscope; for minute objects are difficult to find, even after long practice with the instrument. Dr. Cruise confesses that he cannot even detect the verumontanum, or the orifices of the ejaculatory ducts, in the healthy urethra.

"With respect to its use in vesical calculus, I think little is to be gained by looking at it through the tube. I think the educated hand—the *tactum eruditum*—a better guide to information respecting the calculus than all the looking which the present endoscope permits, especially when the very important consideration next to be noticed is taken into account. It is this: the really valuable maxim which I implicitly believe to underlie all success in the surgical treatment of urethral and vesical disease, is to diminish as much as possible all sources of mechanical irritation. I am convinced that patients suffer greatly from unnecessary instrumental interference. The principle adopted by the surgeon should be that all instrumentation is, to a certain

extent, an evil, only to be submitted to when a greater evil is present, and which there is good reason for believing that the instrument will lessen or remove. Every year I am more convinced of the value of this maxim, and more and more act upon its indications. It is this which has led me to perform lithotrity invariably without preliminary injection, and commonly without any subsequent one; and also to limit the length of the sitting to one, or or at most two, minutes. Lastly, in the treatment of stricture, to employ the softest and most flexible instruments, instead of the inflexible and metallic, in direct opposition to my earlier convictions and to the especial traditions of my school.

"I confess, then, to some little apprehension that the endoscope, as an instrument almost new to many, will raise greater expectation of benefit from its use than it can possibly fulfill. It cannot be employed without some degree of pain and irritation, more than that produced by the passing even of a metallic catheter—and a somewhat prolonged application of it is necessary to be of any value. Its employment in the bladder is more irritating than an ordinary sounding for stone, and more prolonged; it is necessary, also, to remember that the essential element for the right use of mechanical appliances, in cases of stricture and stone, is not the sense of vision, but a highly educated sense of touch; we cannot see what we are operating on, as in diseases of the eye or of the larynx; hence I do not agree that the endoscope can rank in utility with the ophthalmoscope or with the laryngoscope.

"For some diseases of the rectum it is, I think, different. In case of ulceration within the rectum, it enabled me to apply caustic to the upper end of a large ulcerated surface beyond the reach of the ordinary speculum. It may be added that the ulcer finally healed, and the patient is now in good health.

"I may just say, in conclusion, that the late Mr. Avery gave me the opportunity of seeing, I think in 1850 or 1851, the mode of observing the urethra with his endoscope, and the results he obtained at that time were quite equal to any I have seen with Desormeaux's instrument."

VARIA.

To the Editor of the New York Medical Journal:

Dear Sir—In the second edition of my work on the Principles and Practice of Medicine, I have inadvertently committed an error admitting of an inference which I beg permission through your columns to forestall. Giving some account of cholera in this city during the past summer, I have said as follows: "In New York, in anticipation of an epidemic visitation, the administration of affairs relating to public health was vested in four Commissioners, three of whom are distinguished members of the medical profession"—(page 473).

It is an error of omission not to have stated that these four Commissioners acted in conjunction with the Police Commissioners and the Quarantine

Physician; and, inasmuch as there are four medical members in the Board, my language admits of the construction that only three of the four are distinguished members of the medical profession. To disclaim such a construction is the purpose of my asking you to insert this note. The quotation was penned under an impression, at the moment, that there were but three medical members in the Board. It is now too late to make the correction in the work, and I am therefore anxious, in justice to myself, to state that I had no intention of saying otherwise than that *all* the physicians in the Board of Commissioners are distinguished members of the medical profession.

With much respect, very truly yours,

AUSTIN FLINT.

The International Medical Congress.—We have received the programme adopted by the committee appointed to organize the plan of procedure for the proposed International Medical Congress, to be holden at Paris, in 1867, in connection with the Exhibition, and to which we called the attention of our readers in the issue of the Journal for August. For the information of those who desire to take part in the proceedings, we translate such portions as give the prominent points.

The Congress will be opened on the 16th of August, 1867, under the auspices of the Minister of Public Instruction, and will continue in session two weeks.

It shall be composed of national members or founders, and associate foreign members. The national members will be required to pay each twenty francs, but the associate members are relieved from all pecuniary contribution.

The members of the Congress, national and associate, shall alone take part in the discussions, and the committee have proposed as subjects of discussion the following:

I. The anatomy and pathological physiology of tubercle; tuberculization in different countries, and its influence on the general mortality.

II. The common accidents which lead to a fatal result after surgical operations.

III. Is it possible to propose to the different governments any effective measures for restraining the propagation of venereal diseases?

IV. The influence of alimentation employed in different countries on the production of certain diseases.

V. The influence of climates, races, and different conditions of life in different countries upon menstruation.

VI. The acclimatization of European races in hot countries.

VII. On the entozoa and entophytes which can be developed in man.

Members wishing to make any communication upon the questions of the programme, or to propose any other subject, must send their essays to the General Secretary, at least three weeks before the time of meeting. The committee will decide upon the fitness of the communications, and the order in which they shall be received. Each question will occupy but a single sitting, and a maximum of twenty minutes only will be allowed for reading each essay.

Accompanying this programme is a commentary on the questions proposed, indicating the points that are especially desired to be brought out in the discussion, and given with the view of securing precision, with the necessary brevity, in the essays. We have no space for it at present, but will endeavor in our subsequent issues to present some of the more important parts of the same.

New York Medical Journal Association.—The rooms of this Association were formally opened to the profession on the evening of November 8th. Short addresses were made by Professors Taylor, Post and Hamilton, stating the character and objects of the Association, and calling upon the profession to sustain the enterprise. The Friday evening "Reunions" will be continued through the winter, and the programme for the next two months is nearly completed. Papers are promised by Drs. Bumstead, Noyes, Buck, and other prominent gentlemen. It is sincerely hoped that the enterprise will be liberally encouraged, and already large accessions have been made to the number of members. With judicious management, the association can lay the foundation for a public medical library—a need that is much felt in this city, and besides it offers a suitable opportunity for the carrying into effect the suggestion we made in a recent number, of establishing a medical club, which cannot fail to be productive of good results, both in favoring social intercourse and in the interchange of professional opinions among medical men.

The New York County Medical Society.—The sixty-first anniversary of this Society was celebrated in a becoming manner on the evening of November 14th. Dr. Finnell, the retiring President, introduced his successor, Dr. Hubbard, in a brief speech, in which he alluded to the cheering prospects of the Society, and the increased interest that has been manifested in its meetings during the year past, as well as the large accessions that have been made to the number of members. Dr. Hubbard then delivered a short address, giving an account of the origin of the Society, the causes which had combined to cause it for some years past to pass into comparative obscurity; and

bespeaking for it in the future that position to which, as the second oldest medical society in the State, and as embracing many of the most honored names of the profession, it ought assuredly to lay claim.

After the transaction of the usual routine business, the announcement of the election of members, appointment of standing committees, etc., the Society adjourned to the hall, corner of 23d street and Broadway, where the collation was provided. Nearly three hundred members of the profession were here assembled, and after due attention had been paid to the substantial supper, speeches were made by his Honor Mayor Hoffman, Dr. Hutchinson, the President of the State Medical Society, Dr. Curry, President of the Westchester County Medical Society, Dr. Oterson, President of the King's County Medical Society, Dr. Anderson, President of the Academy of Medicine, Prof. Willard Parker, Jas. R. Wood, and others.

The party broke up at midnight, the members joining in chorus of "Auld Lang Syne."

It is hardly necessary to add that the reunion was a complete success; and it is to be hoped that the interest and good feeling manifested on the occasion will be productive of good results, not alone in directing attention to the Society and in increasing its usefulness, but in uniting the profession of this city in closer bonds of social union, and in doing away with that spirit of exclusiveness which is too well defined among many circles of our medical society.

The Orthopædic Dispensary.—This institution, of which Drs. Charles F. Taylor and William E. Vermilye are the Resident Physicians, is now in active operation, at 1303 Broadway, near 35th street. The need of such a charity has long been felt, for at our other city dispensaries this class of cases cannot receive proper treatment—not that the surgeons in attendance are incompetent to attend the cases, but no provision is made to meet the expense for furnishing a special apparatus for each case. The dispensary is supported entirely by voluntary aid. No salaries are paid to any of the officers connected with the institution, and every dollar contributed for its support is to be expended for the benefit of those who, it is hoped, may be saved from growing up deformed and wretched themselves and a burden upon society.

It is requested that subscriptions be sent to the Treasurer, and an appeal is made for contributions to those who are disposed to assist in the inauguration of methods of relief for a class of sufferers who have heretofore been left almost wholly uncared for. An opportunity for clinical observation and the study of deformities, diseases of the

spine, hip joint, etc., is here afforded to students and practitioners of medicine, perhaps better than is to be found at any other institution in the country. The hours of attendance are from 2 to 3 P.M., daily.

The consulting surgeons are John T. Metcalfe, M.D., Willard Parker, M.D., C. R. Agnew, M.D., T. M. Markoe, M.D., William H. Van Buren, M.D.

We have received from our esteemed contributor, Dr. John H. Packard, of Philadelphia, a finely printed and illustrated sheet containing a series of directions to be followed in cases of injury by machinery, railroad accidents, etc., when no surgical assistance is at hand. The rules are explicit and easily understood by any of ordinary intelligence. The sheet is printed in Philadelphia, and is intended for distribution throughout the country, to our large manufactories, railroads, etc. It cannot fail to be of good service, and the proposal to distribute it widely is worthy of encouragement.

The Medical and Surgical Monthly, of Memphis, Tenn., closes its publication with the issue for August, after an existence of only six months. The editor, in announcing the demise of his journal, bravely and somewhat bitterly takes to task the profession in his city and vicinity, who have failed to meet their engagments with the publication, and complains that the enterprise has not met with that generous and practical response which the promises and approval of his subscribers had led him to anticipate.

Dr. HENRY BRYANT, of Boston, has purchased and presented to the Society of Natural History, in that city, the La Fresnaye collection of birds, one of the largest and most valuable in Europe. It numbers nearly nine thousand specimens, all stuffed and mounted in the best manner.

Dr. RUTHERFORD HILDANE has resigned the editorship of the *Edinburgh Medical Journal*, and is succeeded by Dr. Saunders. Dr. Markham has also resigned his position as editor of the *British Medical Journal.* His successor is not yet appointed.

Dr SAMUEL LOGAN has been elected Professor of Anatomy in the Medical College of Virginia, *vice* Prof. A. E. Peticolas, resigned, to accept the Chair of Anatomy in the New Orleans School of Medicine.

Dr. ARTHUR HILL HASSAL has been granted a pension from the Civil List by her Majesty Queen Victoria, in recognition of his distinguished public and scientific services.

Death of Surgeon C. S. Tripler.—Brevet Brig.-Gen. C. S. Tripler, Surgeon U. S. Army and Medical Director of the Department of the Ohio, died of cancer, at the age of sixty years, at Cincinnati, Ohio, on the 22d of October.

Gen. Tripler was born in New York, in 1806. Of his early life we are in possession of no special details, save the fact that he graduated at the College of Physicians and Surgeons in New York, and entered the regular army on October 30, 1830, as an assistant surgeon. On July 2, 1838, he was admitted to full rank as surgeon. After service for a number of years, during which he continued to steadily advance alike in general esteem and professional attainments, he was ordered to Mexico, and served through Scott's celebrated campaign from Vera Cruz to Mexico, as Medical Director of Gen. Twiggs' division. On his return, he was first ordered to California, and then to the frontier beyond the Mississippi and east of the Rocky Mountains. At the outbreak of the rebellion, Dr. Tripler was on duty at Newport Barracks, Kentucky, and was immediately summoned to Washington, and appointed Medical Director of Gen. Patterson's army in the Shenandoah Valley. On Gen. McClellan's accession to the chief command, Dr. Tripler was appointed Medical Director of the Army of the Potomac, and organized the service of that Medical Department. He was soon after nominated by Mr. Lincoln for Medical Inspector-General of the United States Army, but not confirmed, and after the battles in the Peninsula was relieved from duty with the Army of the Potomac, at his own request, and became Medical Director of the Department of the North. He was shortly after brevetted a Colonel for faithful and meritorious service, and just before his death was again promoted to a brevet rank of Brigadier-General. For the past two or three years he has filled the responsible post of Medical Director of the Department of the Ohio.

Dr. Tripler occupied a position in the front rank of his profession, and was one of the ablest surgeons of this country. He was at one time Vice-President of the American Medical Association, and has for years represented the army in its annual sessions by the appointment of the Secretary of War. He was, at the time of his death, the third of the senior surgeons in the army, and among his brethren in that organization he was the chief in procuring the honors of regular rank for that branch of the service.

Death of Dr. Brainard.—Dr. Daniel Brainard, President and Professor of Surgery of the Rush Medical College, Chicago, Ill., died of cholera in that city on the 10th of October. He was in his usual

good health up to within a few hours of his death, and had, singularly enough, on the afternoon of that day delivered a lecture at the College on the disease to which he so soon afterwards became a victim.

Dr. Brainard had but recently returned from a visit to Europe, and was intending to go back to Paris, where his family were residing, as soon as he had completed his winter course of lectures.

"Dr. Brainard was blessed with an iron frame and a commanding person. His figure was tall and stately; his manner was the soul of dignity. One could not enter his presence without feeling a sense of the greatness of the man. As a teacher he stood without a rival. The order, the method, and the clearness of his lectures have never been surpassed. As a writer, he is best known by the essays which have been scattered through the medical journals of the country. The great work of his life, though long announced, remains incomplete—cut short by his untimely death. As a scholar, his attainments were not bounded by the limits of his profession. There was no department of science which he had not explored; there was nothing too low, nothing too high for the range of his observatión."

Dr. Brainard had long held a recognized position among the most eminent surgeons of this country, and enjoyed a reputation abroad such as but very few in his conceded department have attained. His death will cause an irreparable loss to the profession and to the institution of which he was the head, and will long be felt as a public bereavement by the city with whose founding and growth his life has been so closely identified.

William H. Church, M.D., a graduate of the College of Physicians and Surgeons of this city, and one of the surgeons to Bellevue Hospital, died of phthisis pulmonalis, at Paris, France, on the 27th of September, aged 41 years.

Dr. G. H Barlow, the distinguished physician of Guy's Hospital, died at his residence, Sydenham, on the 13th of October. He was for some years editor of Guy's Hospital Reports, to which he contributed very largely, and was the author of a work on "Diseases of the Kidneys" and a "Manual of the Practice of Medicine."

Dr. John M. Watson, Professor of Obstetrics and Diseases of Women and Children in the University of Nashville, died near Nashville, September 19th. The vacancy occasioned by his death has been filled by the transfer of Prof. W. T. Briggs from the Chair of Physiology; and Prof. Joseph Jones, who was recently appointed to the Chair of Pathology in the University, will also fill the Chair of Physiology made vacant by the transfer of Prof. Briggs.

Dr. William E. Townsend, of Boston, died of cholera in that city, on the 19th of November.

M. Rostan, honorary professor of clinical medicine in the Paris Faculty of Medicine, died of diabetes on the 4th of October, at the age of seventy-seven years. Rostan was the head of that school in France which referred all diseases to organic changes—views which are fully set forth in his great work on "Clinical Medicine," which passed through several editions. He was the great rival of Broussais, and both had, at the time of their active teachings, crowded audiences of enthusiastic pupils—this circumstance being chiefly due to the great oratorical ability of both. A peculiar trait of his character was his remarkable affection for the medical students, and when his disease became so seated that he knew that it must prove fatal, he moved his residence to the neighborhood of the medical schools. "He could not bear," he often said, "that his dear pupils should be obliged to go so far to attend him to his last abode." The French journals give full details of his funeral. All the leading members of the profession, as well as of the learned societies, were present. MM. Bouchardat, Dubois and Beclard represented the Academy.

Professor Pilz, the celebrated ophthalmologist of Prague, died of apoplexy, on the 7th of August.

Alcohol and Insanity.—Dr. Joly has lately made a report to the Academy of Medicine, Paris, in which he deprecates the increased tendency to the consumption of alcohol by the French nation. A hundred years ago France consumed 200,000 hectolitres of alcohol yearly. She now consumes 4,000,000. Dr. Joly declares that an increasing tendency toward mental disease has been generated by the increasing consumption of spirits; and an official report lately published seems to corroborate his views—the abuse of alcohol accounting for one-fifth of the insanity in France.

Medical Martyrology.—A sad list of physicians who have fallen victims to their devotion while succoring the sufferers from the reigning epidemic, comes from the Continent. At Leipsic, Dr. G. Gunther, chief of the surgical clinique of the hospital of that city, has succumbed to cholera. At Breslau, Dr. Klopsch, who has acquired reputation by his writings on orthopædy, has been carried off by the same malady. Vienna deplores the loss of two of its most distinguished practitioners —M. le Baron Wattmann-Beauliere, surgeon to the Emperor, and Dr. Franz Liharzik author of a remarkable work upon "Development." English professional men will remember the series of models and dia-

grams by which the views of the latter were illustrated in the Great Exhibition of 1862.

Finally, in the short campaign of the last war, no less than *eleven* Prussian physicians died from cholera.

The General Hospitals of Paris.—These are eight in number, and as a mean, deduced from the experience of eight years (1855–'63), furnished the following statistics: Hôtel-Dieu, 796 beds, with a mortality of 10.54 per cent.; Pitié, 594 beds, mortality 11.91; Charité, 480 beds, mortality 9.59; St. Antoine, 330 beds, mortality 10.39; Necker, 346 beds, mortality 11.02; Cochin, 116 beds, mortality 9.85; Beaujon, 339 beds, mortality 11.13; Lariboisière, 617 beds, mortality 11.70.

M. Velpeau and M. Jules Guérin.—Both these surgeons are members of the Academy of Medicine of Paris; the former, however, as every one knows, is professor at the Faculty, whilst the latter is unconnected with official teaching. For the last thirty years a somewhat bitter warfare has occasionally been carried on between these two eminent men, and one of the fiercest disputes is going on at the present time before the Academy.

M. Jules Guérin maintains, both in his speeches and in the *Gazette Médicale de Paris*, of which he is the able editor, that he is the *inventor* of subcutaneous surgery; and M. Velpeau, though allowing his opponent some share in the merit of having extensively applied subcutaneous sections, refuses, year after year, to admit the claim. It so happens that both belligerents are gifted with great elocutionary powers, that both are extensively read, and that both are wonderfully persevering and unyielding.

Those interested in subcutaneous surgery will find a mass of valuable information in the speeches recently delivered; and will, perhaps, remain convinced that, in the face of Stromeyer's and Schönbein's labors, the claim of *discovery* can hardly be defended. They will, at the same time, allow that great credit is due to M. Guérin for his valuable orthopædic labors. Not the least of the results obtained by the latter surgeon is the healing of large wounds by first intention through pneumatic occlusion.

At the bottom of the debate lies the fact that M. Velpeau represents the scholastic interest, the pride of the faculty and the professional dignity, against the really talented doings of an independent surgeon, unconnected with official position. The late M. Amussat, whose name is well known in the surgical world, succeeded, like M. Guérin, in becoming an eminent operator without attaining hospital

or university distinction. These cases, however, are rare; for it requires an unusual amount of skill, perseverance and surgical tact to triumph over the difficulties besetting private practice. M. Guérin is a specialist; he has done good service in his orthopædic establishment. Like Behrend, of Berlin, too, he is not slow in publishing his success, and is ever ready to fight hard battles in order to uphold his well earned reputation.—*Lancet.*

French Jurisprudence.—Duke Caderousse-Gramont died a short time ago of phthisis, leaving the bulk of his large fortune to his physician, Dr. Déclat. The Duke's prodigality had been so notorious that the family had interfered a few years ago and obtained some control over the property. Piqued at these proceedings, the deceased had intended, by his will, to frustrate the rightful heirs. The latter attacked the will, and easily had it declared null and void, as, by the French law, the medical man in attendance on a testator cannot be made heir to the latter.

Dr. Watzke, of Vienna, has published a paper with a title ominous to the homœopaths, *On the Causes of the Dearth of Homœopathic Recruits.* The dearth is also admitted in England, in the following comment on Dr. Watzke's paper, by an English homœopathic journal. "We incline to think that the greatest reason is, the want of theoretical and clinical professorships of homœopathy. A very large number of the allopathic profession would willingly study homœopathy, were there some '*men to guide them.*' Our literature wants arrangement, and our principles and practice require public demonstration."

Paris Faculty of Medicine.—This body, it is said, is likely soon to undergo considerable change in its *personnel*, and not before this is required, if it be true, as stated, that no less than seven professors are incapacitated by age or illness, not to mention M. Trousseau's imminent resignation. The chair of clinical surgery, lately held by M. Jobert (de Lamballe), now hopelessly insane, is to be immediately filled.

Dr. John Brown, of Edinburgh, the genial author of "Locke and Sydenham," and "Horæ Subsecivæ," the last work being published in this country under the title of "Spare Hours," it is said, has become hopelessly insane.

Académie de Médecine.—At a recent meeting of this learned body the celebrated pathologist, M. Lebert, of Breslau, was elected a corresponding member, by the votes of 51 out of 53 members who were present. Drs. Bennett, of Edinburgh, and Magnus Huss, of Stockholm, were the other candidates.

THE DEAD SEA.—M. Jerrell, who accompanied the Duc de Juyes to Palestine, in 1865, has addressed a paper to the Académie de Médecine on the chemical composition of the Dead Sea. It has generally been considered that this lake is untenanted by living creatures; but M. Jerrell states that, near Sodom, he distinctly saw a number of small fish, seeming to thrive very well. His observations may be summed up as follows: 1. The density of the waters of the Dead Sea increases with their depth. 2. Their composition is not everywhere the same. 3. Their concentration is likewise variable. 4. Of all the salts, the bromides seem to be much more concentrated at the bottom. 5. The waters of the Dead Sea contain no iodine, or phosphoric acid. 6. Their residue, after evaporation, does not, by the spectroscope, reveal the presence of either lithium, essium or rubidium. They contain little sulphuric acid.

ANNOUNCEMENT.—Dr. John C. Dalton, Professor of Physiology in the College of Physicians and Surgeons, will read a paper on "Vivisection" before the Academy of Medicine, on the evening of the 13th of December. As the subject is just now attracting a good deal of attention, owing to the course taken by Mr. Bergh, the President of the Society for Prevention of Cruelty to Animals, the views of Professor Dalton will be looked for with interest. The profession are invited to be present.

The faculty of the Bellevue Hospital Medical College having been informed of the death of the late Simeon Draper, first President of the Board of Commissioners of Public Charities and Correction in the City of New York, and President of the Board of Trustees of this College, do resolve:

1st. That they recognize in this affliction the loss of a public-spirited citizen of great executive ability, who found the best and most congenial sphere for the exercise of his talents and enlightened sympathies in the fulfillment of his duties to the impoverished, the friendless and the orphan; while in their performance he displayed that rare union of unwearied personal kindness, decision, genial warmth and practical wisdom which endeared him to all.

2d. That, during his long connection with the public charities of the city, he never swerved from his determination to advance the interests of true medical education, whereby the knowledge gained at the hospital bedside should be made available for the instruction of students, who might bear its blessed influences to distant scenes of suffering.

3d. That in the development of these views the organization of this College received from him such hearty and consistent support that its public recognition is due to his memory, both from a feeling of gratitude and the recollection of so many pleasant associations.

4th. That a copy of these resolutions be sent, with the expression of our sympathy, to the family, to the Commissioners and to the Board of Trustees; that they shall be published in the daily morning papers and the medical journals of the city; and be formally read before the class now in attendance on lectures.

ISAAC E. TAYLOR, M.D.,
President of the Faculty.

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ORIGINAL COMMUNICATIONS.

The Histological Doctrines of M. ROBIN. By WILLIAM T. LUSK, M.D., New York.

The object of the following papers is to render accessible to the medical profession in this country a summary of the prominent doctrines entertained by the French School of Histology. The labors of M. Robin, its mouth-piece and chief authority, are by no means as familiar to the general public as those of the contemporary German school. For the present his writings are in too scattered a form to be extensively read, except by the professional histologist. A brief review, therefore, of M. Robin's teachings, it is believed, would be welcome to many who, though not laborers in the field, follow with interest the progress of microscopic science.

The materials for these papers are, in a great measure, derived from a course of familiar and private instruction furnished the writer by Mons. *Georges Pouchet*, assistant to M. Robin, lecturer upon anatomy and histology to the Ecole Pratique, author of "Un Précis d'Histologie," etc., etc.

The French metrical system has been retained on account of the convenience the decimals afford for comparison. It is sufficient to state that .007, the diameter given for the red blood globule, is very nearly $\frac{1}{3500}$ of an inch.

ANATOMICAL ELEMENTS.—The human body is composed of a certain number of parts of a definite form, which have received the name of *anatomical elements*. These are minute, ordinarily microscopic bodies, though sometimes of considerable length: thus certain elements extend from the lower part of the spinal cord to the extremity of the foot.

All the tissues, all the various parts of the organism, contain anatomical elements. Sometimes, as in the epidermis, they are placed in simple juxtaposition, while in other cases they are contained in the interspaces of an amorphous matter. By the reunion of the elements in certain fixed proportions the tissues are constituted.

The forms of the elements are three-fold, viz., fibres, tubes and cells.

The *fibres* are generally of considerable length, while their diameter is small, often not exceeding .001.

The *tubes* offer as objects of study the walls and the cavity.

The *cells* of vegetables have a wall, a cavity and contents (air, oil, etc.) The cells of animals, on the contrary, are, as a rule, homogeneous. Animal cells containing a cavity are only found exceptionally. The substance of cells is ordinarily granular. Most cells contain an ovoid nucleus more granular than the substance itself.

Cells may be, as to *form*, either spherical, cylindrical or stellate.

In all cells the nuclei afford different chemical reactions from those of the substance of the element. Each cell is an independent organism, passing through various stages of development from birth to death.

The anatomical elements possess characters of four orders: mathematical, chemical, physical and organic.

The *organic* characters are further subdivided into *vegetative* and *animal.*

The *vegetative* characters are birth, development and death. They are common alike to vegetables, to animals, and to all the anatomical elements.

The *animal* characters are sensibility, contractility and thought, and are confined to certain only of the anatomical elements.

I. *Birth.*—The birth of the elements takes place by—1st, segmentation; 2d, genesis; 3d, epigenesis; 4th, gemmation.

1st. Segmentation. The human ovum is a small, hollow sphere, containing in its interior the vitellus or yolk, which consists of granular matter in a hyaline substance. At the end of a certain time particles of the granular matter approximate, unite, and form a nucleus in the vitellus. Next the nucleus elongates, takes an hour-glass form (*biscuit*), then divides. The division of the yolk occurs simultaneously. In the same way the division takes place into 4, 8, 16 and more parts. These divisions of the vitellus have received the name of *vitelline globes*. Their mode of formation is called *segmentation*.

2d. Genesis. When the vitelline globes have become very small by successive segmentations (diameter .008), these little bodies take the name of *embryonic cells*. According to M. Robin, these cells dissolve. From the fusion results a blastema, in the midst of which nuclei make their appearance. This is known as *genesis*. It is the second and most frequent mode of the formation of anatomical elements. It is characterized by the appearance of an anatomical element in a fluid termed blastema, in which the element did not previously exist.

3d. Epigenesis. This subject will be considered in treating of the birth of connective tissue.

4th. Gemmation. This is very frequent in vegetables, but in animals only one example is known, viz., at a period previous to the fecundation of the ovum. Before segmentation takes place the vitellus is observed to retract. The hyaline substance pushes out a prolongation, which becomes round, separates, and constitutes in itself an independent anatomical element, exterior to the vitellus, and bearing no part in the future development of the ovum.

II. *Development.*—Anatomical elements, as a general thing, have not at the time of birth either the size or form which they subsequently attain. The history of each element must contain the history of its development.

III. *Death.*—The usual mode is by the appearance of fatty granules in the midst of the element. At other times death takes place by liquefaction. In no case, however, is the decadence of an anatomical element a simple return to the condi-

tions of its early existence. Death may take place at any period of elemental life.

Elements, as well as individuals, are subject to disease. The forms common to them are—1st, atrophy; 2d, hypertrophy; 3d, granular state (*état granuleux*); 4th, deformation.

Atrophy and Hypertrophy.—In *atrophy* there is simple diminution of volume. In *hypertrophy* the animal cell enlarges. Usually the nucleus likewise increases in size. Next, in many cases, a nucleolus, or two nucleoli, not existing in normal conditions, appear in the nucleus. Again, in the hypertrophied cell, two nuclei may form by the segmentation of the first. In the same way the number of the nuclei may become considerable. As the nuclei multiply the cells frequently lose their accustomed shape (cancer cells).

Granular state.—This consists in the deposition of fat granules in the interior of anatomical elements. It corresponds to the *old age* of the elements.

Deformation.—The process begins by the formation of a cavity in a cell. This may enlarge without any corresponding change in the diameter of the cell, which thus comes to resemble those of the vegetable variety. Generally the nucleus remains in the cell wall. The cavity thus formed is filled with a liquid which is sometimes, but not always, oily. When the latter is not the case, the liquid may contain nuclei in suspension analogous to that of the cell, or two small cells with their nuclei, or, finally, a globule of pus. These are all varieties of cancer cell. They may, however, be found normally in the placenta, œsophagus, etc.

The following elements require a few words of special description.

Red blood globules (*hématies*), diameter, .007; thickness, .002. Nearly all the round nuclei have the diameter of a red blood globule. The oval ones vary from .006 to .010.

Nearly all cells are three times the diameter of their nuclei.

Blood globules are elastic — a property enabling them to elongate, and pass through capillaries which have a calibre less than the diameter of the blood globule. They are homogeneous throughout—*i. e.*, have no cell wall.

Blood globules are formed by *genesis* in the blood plasma. In the fœtus they make their appearance before the white blood globules (leucocytes). In the chick, red blood globules are found in the *area vasculosa*, before connection takes place between the latter and the vessels of the embryo.

In man, there are two kinds of red blood globules, viz., 1st, embryonic; 2d, normal. The *embryonic* blood globules are double the size of the normal ones. They have a slightly granular nucleus, situated nearly in the centre, which is insoluble in acetic acid. The *normal* blood globules are not a transformation of the embryonic. They appear by *genesis* in the midst of the blastema of the blood. After the fourth month the embryonic globules cease to form, and as the mass of blood increases the proportionate number diminishes with great rapidity.

Leucocytes (white blood globules).—These are found in many tissues, in the blood, on the surface of mucous membranes; in a word, they are the pus corpuscles. In form they are round, with pale, well defined borders, and contain extremely fine, gray granules. They possess a very thin envelope, and a granular cell contents. The normal diameter is .008, but in the cadaver this may increase to .012, .015. On the addition of water the leucocytes swell, the granular particles are agitated by a peculiar movement (first observed by Brown), and, finally, a considerable number of these particles unite, so as to form 2–3 little masses, that have been mistaken for nuclei. Upon the addition of acetic acid the same reaction follows, but with greater rapidity.

The mode of production may be followed, step by step, upon the surface of wounds, especially little ones. At first a hyaline liquid appears. At the end of a couple of hours this liquid becomes finely granular, and then, all at once, in the midst of the granulations, we perceive small granular bodies, analogous to leucocytes, offering the same chemical reactions, but measuring only .003 in diameter. They are, in fact, leucocytes of young growth. When leucocytes are retained in the economy, as in shut sacks, they increase in size, and reach a diameter of .012. Then they fill with fat granules, and are known as *corpuscles* of *inflammation*. Finally, the substance

and investing membrane of the leucocytes disappear, the granules dissolve and are reabsorbed.

Capillaries.—The finest capillaries are anatomical elements of tubular form, with transparent, resistant walls, which measure .001 in diameter. These walls contain granular ovoid nuclei, which project sometimes exteriorly, sometimes upon the inner surface of the tubes. These nuclei measure .006 in the transverse and .008 in the long diameter. Their long axis is parallel to that of the vessel. The finest capillaries have a diameter of .007, leaving a calibre (after deducting the walls) of .005 or .002 less than the average diameter of the blood globules which traverse them.

They are formed as follows: 1st. In new tissues hollow projections push out from contiguous capillaries, which meet, and unite together. 2d. A solid filament forms, in which nuclei make their appearance. Subsequently, the filament becomes hollow, and its nuclei remain the nuclei of the capillary.

Anatomical Tissues.—Composed of, 1st, elements in juxtaposition; 2d, elements separated by amorphous matter. The *amorphous matter* which separates elements may be entirely transparent, and then is not recognizable under the microscope. Generally it is finely granular. The amorphous matter of each tissue is peculiar to it. It is in itself an element of tissue, subject to disease, and capable of producing pathological tissue in which other elements are normal.

Anatomical tissues may be divided according as they are composed of *one* or *several* elements.

When a tissue contains several elements, one of these usually predominates, and is called the *fundamental element;* the others the *accessory elements.* The fundamental element in one tissue may be accessory in another: thus, capillaries are fundamental in erectile, accessory in connective tissue.

Tissues may be *transitory* (embryonic tissue, cartilage), existing only during fœtal life or early infancy, or *normal—i. e.*, persistent in character.

Pathological Tissues.—Law. No element is found in the diseased economy which does not exist under normal conditions. Thus cancer cells, tubercle corpuscles, etc., are not foreign to the economy, but natural elements more or less diseased.

Hypertrophy. — The fundamental and accessory elements multiply considerably without the relative proportion being affected. *Atrophy* is the inverse process. In both cases the properties of the tissues are unaltered.

Alterations in the properties of tissues may result from the change in the proportions of the constituents. There may be, 1st, disappearance of the fundamental element, in which case the tissue comes to be composed solely of accessory elements; 2d, while the fundamental element disappears an accessory element becomes fundamental in its place; 3d, an accessory element becomes fundamental without the disappearance of any element. An accessory element thus transgressing ordinary bounds is said to be affected with *hypergenesis.* This is a frequent cause of pathological tissue.

All the transitory tissues may reappear in the adult. This species of *heterocrony* is particularly true of embryonic tissue.

Law. All the tissues of the body may be reproduced in any part of the body whatever (heterotopy). This has not *actually* been observed of all the tissues (muscle, etc.), but appears probable.

Relapse (*récidive*). — So long as we are ignorant of the primary cause of the formation of pathological tissue, we can never be sure of having removed that cause. Surgery does not cure. Sooner or later the pathological tissue may return. In general, all encysted pathological tissue is less subject to return (*récidive*). Many pathological tissues owe their novel character to the disease of the fundamental element.

Vascularity of Tissues.—Tissues differ as to vascularity. Some even are wholly destitute of vessels. Morbid masses, of considerable size, are found in the economy, whose anatomical elements derive their nutrition, not from vessels, but from contiguous elements. In general, any alteration of the capillaries induces alterations in the neighboring anatomical elements.

Systems of Tissues.—*Connective Tissue* (*tissu lamineux*). A fragment of connective tissue placed under the microscope presents the appearance of undulating fibrillæ, disposed in bundles or in layers. These fibrillæ are the *non-elastic fibres* of connective tissue (*fibres lamineux*). They measure .001 in breadth, and are of unknown but certainly of very consider-

able length. Between the bundles and layers there is an *amorphous* matter, serving as an accessory element. Between the fibrillæ fat vesicles are distinguishable. These vesicles have a very fine wall, and a cavity with oily contents: diameter of vesicle, .020–.050. In one point of the wall is a pale nucleus. Connective tissue contains capillaries as an accessory element. On the addition of acetic acid the non-elastic fibres disappear, and in their place two other elements, previously undistinguishable, come to light, viz., *nuclei* and *elastic fibres.* The *nuclei* are ovoid, finely granular, without nucleoli, and are called *embryo-plastic nuclei.* The *elastic* fibres are larger than the non-elastic, twisted, yellow under the microscope, frequently anastomosing with one another.

Connective tissue, therefore, is thus constituted:

Fundamental element—non-elastic fibres;

Accessory elements—amorphous matter, adipose vesicles, capillaries, nuclei (embryo-plastic), elastic fibres.

When the embryonic cells dissolve, the embryo-plastic nuclei are produced by *genesis* in the blastema which results from their fusion. Then little cone-like prolongations of transparent matter are observed at the extremities of the nuclei, giving rise to the *fusiform* bodies. The prolongations are non-elastic fibres in the act of growth. The mode of formation by growth upon another element is termed *epigenesis.* Many of the fusiform bodies continue to exist in the peritoneum of the infant at birth.

Sometimes the substance deposited by epigenesis upon the nucleus has several prolongations, forming a *stellate cell.* Each prolongation is destined to be a non-elastic fibre. These stellate bodies persist in many tissues and membranes, though difficult to recognize. Sometimes, however, they become prominent by the deposition in them of pigmentary granules, as in the *lamina fusca*, and the pia-mater of subjects who have a pigmented brain.

The fusiform and stellate cells are likewise known as *embryo-plastic* or *fibro-plastic* bodies.

From the third month, in the fœtus, fat granules are deposited in a certain number of the stellate bodies of the armpit and folds of the thigh. These granules unite to form drops of

oil, which distend the embryo-plastic bodies and convert them into vesicles, crowding the nucleus back into the cell wall. All connection with the prolongations is lost, and the fat vesicle is constituted.

The *elastic fibres* are likewise formed by *epigenesis*, but upon special nuclei, and the prolongations are insoluble in acetic acid.

There is an early period of fœtal life, previous to the formation of connective tissue, in which we find only *embryo-plastic nuclei* and *fusiform bodies* in amorphous matter. This is called *embryo-plastic tissue*. Growth at this epoch is most rapid, the fœtus reaching in a short space of time the dimension of .030.

Pathology of Connective Tissue. Embryo-plastic tissue may reappear at all periods of life with the same characters as in the fœtus—*i. e.*, it is soft, gelatinous, almost transparent, and is known as *colloid*. It contains amorphous matter in considerable quantity, embryo-plastic nuclei, fusiform and stellate bodies, in variable proportions. It presents several varieties. When normal, it is called *colloid;* if very vascular, *hematodes*.

The amorphous matter may fill with fatty granules, and the tissue become opaque instead of transparent, friable instead of soft, yellow rather than rose-colored; in other words, we have *encephaloid*.

The stellate bodies and amorphous matter may fill with pigment granules, giving rise to *melanosis*.

The tissue of embryo-plastic tumors is vascular, the capillaries being so disposed as to contain in their interspaces non-vascular territories of equal size. Sometimes the capillaries of the centre disappear, and leave a space in which fatty granules are deposited in great numbers. At the same time the amorphous matter liquefies and holds these fat granules in suspension. This is the *central softening of tumors*. As the process goes on, the capillaries continue to disappear from the centre.

Occasionally, in the place of fat granules, there occurs a deposition of carbonate of lime, and, when abundant, the tissue becomes hard like bone, but is non-identical in structure. This is known as *calcification*.

Again, as in the two preceding cases, the vascularity disap-

pears from the centre toward the circumference; but in place of liquefying, the central amorphous matter divides by segmentation into small, irregular fragments, about .007 in diameter. These little fragments have been falsely described as *corpuscles of tubercle.* The French term this process *phymatoid degeneration.*

Inflammation is an alteration in the nutrition of the tissue. It commences in and is, in fact, an affection of the capillaries. At first, certain of these contract; then the red blood globules rapidly accumulate. The finest capillaries become varicose. At the same time the *amorphous matter* of the tissue becomes more abundant and very granular; the non-elastic fibres, more friable. The granulation of the amorphous matter continues to increase. Then, all of a sudden, leucocytes appear, small at first, but increasing rapidly in size. The other elements, with the exception of the elastic fibres, disappear, to make place for them. To the presence of the elastic fibres is due the preservation of the nerves and vessels. *Abscesses* burrow in the direction in which the elements offer the least resistance. When an abscess has destroyed the skin in any point, the leucocytes are discharged. When the skin is destroyed in the case of an embryo-plastic tumor, the contents are not discharged. There results an ulceration—*i. e.*, a suppurating surface, which spreads by the progressive destruction of the skin. In this case, the consequent suppuration destroys the patient.

Adipose Tissue.—The constitution of adipose tissue is the same as that of connective tissue, except that the fat vesicles are the fundamental and the non-elastic fibres the accessory elements.

Lipoma. There are several varieties of this tumor. 1st. A simple hypertrophy of normal tissue. 2d. The non-elastic fibres are in very small numbers, and the fat vesicles are contained in a large proportion of amorphous matter. In such a case the tumor changes its character, and comes to resemble those of the encephaloid variety. 3d. The centre of the lipoma softens. This has been described as a fatty tumor, containing an abscess in its midst.

Fibrous Tissue.—Fibrous tissue is analogous in histological

constitution to connective tissue. The non-elastic fibres are likewise its fundamental element. The amorphous matter is much denser than that of connective tissue. The elastic fibres are ordinarily in small proportion. An exception is found in the dura-mater, especially of children, where, on the contrary, they are very abundant. In fibrous tissue the non-elastic fibres are slightly more resistant to the action of chemical agents.

Fibroma. The fibrous tumors are composed of non-elastic fibres, united in bundles and wound round one another. Generally they possess little vascularity, and in some cases are wholly devoid of vessels. They frequently become calcified at the centre. The *neuroma* is simply a fibrous tumor, derived from the non-elastic constituents of the nerve.

Elastic Tissue.—Here the elastic fibres are the fundamental element. From their predominance results the yellow color and other properties of this tissue. Inflammation in elastic tissue rarely occurs on account of its deficient vascularity. It is not easily destroyed; but, at the same time, regeneration succeeding injury is slow and incomplete. For this reason wounds of arteries do not cicatrize. We know of no tumor formed of elastic fibres; elastic fibres are rare even in tumors of connective tissue.

Muscular Tissue.—The fundamental element is the muscular fibrilla—an element of considerable length, width .001. Considered in its long diameter, it presents alternate dark and light zones. These zones possess each distinctive optical properties—the dark zone having the double, the other the simple refraction. When a fibrilla breaks, it is always at the intersection of two zones. In muscle the fibrillæ are so arranged that all the pale and all the dark zones correspond. Thence it results that, on examining a bundle of muscular fibrillæ, it appears striped transversely, and is known as the *striated bundle.* Muscular fibrillæ are never found isolated in the economy, but always arranged in bundles. Like almost all the fibres, they are formed by *epigenesis*, and in bundles—several of these being produced simultaneously. From the very beginning of embryonic life, at the place destined for the heart, we observe certain nuclei greatly resembling embryo-plastic nuclei. Soon prolongations of a substance, transversely

situated, appear at their extremities. This is a bundle of muscular fibrillæ in the act of growth. During the early period of life we may still find the nuclei in the interior of the striated bundles of the heart.

The tissue of the heart is formed of striated bundles, anastomosing with one another. Between the bundles we find a small amount of connective tissue, some capillary vessels, and fat vesicles. There is a frequent alteration, deriving its name from the physical appearance, termed by the French "mahogany heart." The color is reddish yellow, due to dark yellow granulations deposited in the interior of the striated bundles.

Voluntary muscles differ considerably from those composing the tissue of the heart. In fact, they have nothing in common but the fundamental element—*i. e.*, the muscular fibrilla. With this exception, the analogy ceases. In voluntary muscles the striated bundles never anastomose. They are all parallel, and all extend the full length of the muscle. They measure from .030 to .040 in breadth, and are always contained in sheaths formed of a special elastic substance, but differing from the elastic fibres in *not* resisting the action of the gastric juice. These sheaths are rounded and closed at the two ends. They are formed of a thin membrane containing nuclei at intervals. This membranous sheath bears the name of *myolemma.* The striated bundle, in the interior of the myolemma, generally masks the nuclei, so that in order to see them it is necessary to dissolve the muscular fibrillæ by a reagent like acetic acid, which does not affect the myolemma. In the heart the myolemma is wanting. In voluntary muscles it is formed before the striated bundle contained in it. It is formed by *epigenesis* upon special nuclei. The prolongations to these nuclei unite with others end to end, and form thus a continuous solid filament in which the nuclei remain. Subsequently the filament becomes hollow, and the nuclei remain in the wall. In the cavity of the myolemma, nuclei similar to embryo-plastic nuclei appear by *genesis*, upon which the striated bundles are formed by *epigenesis.* The rounded extremities of the striated bundles adhere by direct contact to the parallel fibres of connective tissue which form the tendons. The same rule of adhesion by direct contact applies to all the anatomical elements

of the body. To suppose an agglutinative substance is only to postpone the difficulty, as it still remains to explain the adherence of this interposed substance.

On making a section of muscular tissue, we see several striated bundles united together without the interposition of any element. Thus we have *secondary bundles* formed, between which we find connective tissue playing the *rôle* of an accessory element of muscular tissue, and bearing the name of *perimysium.* Contractility is a property inherent in the muscular fibrillæ, and is independent of the nervous system, which is simply its normal excitant.

Muscular fibrillæ are never regenerated. We know of no tumor composed of red muscular tissue. In inflammation of the muscles the striated bundles increase in volume, become harder and more granular. Emaciation *(l'amaigrissement)* is produced by the diminution in volume of the striated bundles, and the disappearance of the fat vesicles of perimysium. Corpulence *(l'engraissement)* is due to an increase of the same elements. In *club-foot* the shortened muscles have undergone an *arrest of development.* The striated bundles are very short, very thin and pale, as in the fœtal state, while the development of the perimysium continues. This deformity is almost always congenital, not acquired. When a nerve is divided, and its influence ceases to reach a muscle *suddenly*, the striated bundles diminish a little in size, become speedily granular and disappear. When the nervous influence ceases *gradually*, as in progressive general paralysis, the striated bundles diminish considerably, and reach a tenth of the normal diameter, while granulation occurs very late. In phosphorus poisoning the striated bundles become granular.

Muscles of Organic Life.—The fundamental element of these muscles is the *fibre-cell*, an elongated, fusiform element of variable length, and with a diameter ranging from .006 to .012. It has no proper investing membrane. In the centre there is an elongated nucleus, sometimes twisted like an S. The body of the element is finely granular, and insoluble in hydrochloric acid; the nucleus, in acetic acid. The fibre-cells may exist alone in the economy, but more commonly they are united in bundles, or adhere to one another by immediate contact. If

we add acetic acid the body of the element will dissolve, leaving the nuclei free. The fibre-cells are disseminated throughout the economy. They encircle the intestinal canal, are found in the uterus, in the walls of vessels, in the skin and in the glands. In the unimpregnated uterus the fibre-cells are not much larger than their nuclei. As the uterus enlarges the fibre-cells increase and their tissue softens. When we examine an empty uterus we find its tissue composed of bundles of fibre-cells, with a little connective tissue and a special amorphous matter which is very hard and tenacious. In pregnancy this amorphous matter softens, and serves, in conjunction with the changes in the fibre-cells, to render the tissue softer, especially at the cervix. In the uterus at term we find the fibre-cells at the full stage of development, while frequently, upon the internal surface of the uterus, fatty granulations begin to appear. After delivery the fibre-cells resume their original dimensions. Fibre-cells are contractile like the muscular fibrillæ, but in a different way. The muscular fibrillæ always contract suddenly, at least when the will does not intervene. The fibre-cells always contract slowly, and are independent of volition.

Tumors formed of fibre-cells are very common. They are found in the walls of the gall-bladder, in the prostate, in the skin, where they display their contractile property, and in the uterus and ovaries, under the name of *fibrous tumors*. The tissue is analogous to that of the unimpregnated uterus—*i. e.*, they are composed of a very tenacious, dense, amorphous matter, bundles of connective tissue, and, above all, bundles of fibre-cells. Fibrous bodies, like embryo-plastic tumors, may undergo calcareous degeneration, the process advancing from the centre to the periphery, or beginning at the circumference and proceeding toward the centre. In the latter case the tumors have been improperly described as encased in an osseous envelope.

The Marrow of Bones.—This tissue is characterized by the presence of two special anatomical elements peculiar to it, viz., *medullo-cells* and *myeloplaxes*, of which the former are the fundamental, the latter the accessory elements. The complete constitution of the medullary substance is as follows:

1. Fundamental Element: Medullo-cells.
2. Accessory Element: Amorphous matter.
3. " " Myeloplaxes.
4. " " Capillaries.
5. " " Fat vesicles.
6. " " Embryo-plastic nuclei (rare).
7. " " Fusiform bodies (in the embryo).

Medullo-cells present the two usual varieties, viz.: 1st, free nuclei; 2d, complete cells. The *nuclei* are spherical, finely granular with dark borders, and a diameter of .007–.008. They are insoluble in acetic acid and water, so far resembling the fat corpuscles, while these reactions serve to distinguish them from leucocytes. The *complete cells* are less abundant than the free nuclei; diameter, .012–.015. They are round or slightly polyhedral. Their nuclei occupy the centre. The body of the element is pale, transparent, grayish, with dark, distinct borders. It contains molecular granules, most numerous in the vicinity of the nucleus. Acetic acid causes it to grow paler. They are found very early in the bones of the fœtus. From the sixtieth to the sixty-fifth day the clavicle contains hollow areolar spaces, filled with an amorphous matter, only slightly granular and traversed by vessels. In this amorphous matter the medullo-cells appear by genesis. At first they are little more than half the size which they subsequently attain.

Myeloplaxes, in their largest diameter, generally oscillate between .030 to .060, but may go as high as 0.100 or more. They are irregular in shape, granular, contain a great number of nuclei, and are entirely analogous to cancer cells, with multiple nuclei. Under normal conditions they are found more abundantly in the marrow of the diploë and spongy tissue than in that of the long bones. They are proportionately abundant in the first rudiments of the bones of the fœtus, and at all ages are especially found adherent to the walls of the medullary canals and cancelli.

The *accessory elements*, which enter into the composition of medullary tissue, may be present in variable proportions. Thus varieties are produced differing according to the dominant element.

1st. *Gelatiniform marrow*, found in the long bones of per-

sons dying after a protracted illness. It is gelatinous, colloid, transparent, and owes its properties to the predominance of the amorphous matter, which becomes thus, so to speak, the fundamental element.

2d. *Red* or *fœtal marrow*, found normally in the sacrum and sternum, owing its properties to the predominance of the medullo-cells and myeloplaxes, which appear red when seen in large numbers.

3d. *Yellow marrow*, normal in the long bones. Its properties are due to the predominance of the fat vesicles.

Pathological alterations are numerous. According to certain conditions of health or disease, one of the above varieties may become substituted for another. In many local and general affections the marrow returns to the fœtal state.

Infiltrated tubercle of bone is simply suppuration of medullary tissue.

Encysted tubercle belongs to a different order. The trabeculæ of bone are generally destroyed by the encroachments of a new tissue, composed of, 1st, finely granular, consistent, friable, amorphous matter; 2d, abundant granulations of two kinds, fatty and nitrogenous; 3d, the nuclear variety of medullo-cells, only less regular than in the normal state—in this lesion they have been described as *corpuscles of tubercle;* 4th, myeloplaxes. The fat vesicles disappear, and the new tissue is only slightly vascular.

Tumors of Medullo-cells. Marrow may be the seat of a special kind of tumor, elsewhere rare enough, due to the hypergenesis of the medullo-cells. The characters of this tumor, physical and physiological, merit for it the name under which it was formerly known, viz., *encephaloid tumor* of bone. It is composed of the following constituents: medullo-cells, a finely granular amorphous matter, and capillary vessels.

Tumors of Myeloplaxes. This name has been assigned to those pathological productions known as *osteo-sarcoma*. Many of the *epulis* resemble these tumors in structure. The myeloplaxes are the fundamental element. They may be much exaggerated in size, increasing to a diameter of 0.200 to 0.300. The nuclei increase in size and number; nucleoli are commonly present. Sometimes they contain longitudinal or peripheric

striæ, in the latter case with a concentric arrangement.[1] When these tumors grow to the size of the first, fatty granules form, either in places or throughout the entire mass, giving to the tissue, according to their abundance, a yellow or orange color. They are deposited in the body of the element or in the interstices. Effusions of blood may occur into these yellow portions, and then we find granules of hæmatosin, both in the bodies of the myeloplaxes and between them.

Notes on Fractures of the Upper Extremity. By JOHN H. PACKARD, M.D., one of the Surgeons to the Episcopal Hospital, Philadelphia.

NO. IV.—FRACTURES OF THE FOREARM.

Before leaving the subject of fractures of the humerus, I would mention one which I have twice met with in children, but the precise character of which I could not, in either case, make out with certainty. It was in both the result of a fall, once from a chair, and in the other case from a table. Crepitation was perfectly distinct on passive motion of the elbow; and this, with the loss of active motion in the joint, were the sole symptoms of the fracture. The only diagnosis I could arrive at, and that by exclusion, was that the trochlea itself, strictly speaking, was broken off. The treatment in each case was rest of the part on an angular splint; and both the children recovered the entire use of their arms, without the slightest deformity, in about six weeks.

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[1] The following is a tabular survey of the constituents of these tumors:

Fundamental Element	Myeloplaxes.
Accessory Element	Fibro-plastic bodies.
" "	Amorphous matter.
" "	Fatty granulations.
" "	Some medullo-cells.
" "	Capillaries.

Sometimes the myeloplaxes adhere to one another, at others they are separated by connective tissue. Under the microscope they form, at times, a sort of mosaic, the elements touching one another, or leaving a very limited space between.

Fractures of the Olecranon Process are undoubtedly traceable, in the great majority of cases, to direct violence. Malgaigne collected thirty-five cases, six of which he had himself seen: twenty-seven of these were caused by falls, three by blows, and five were ascribed to muscular violence. But even in those cases in which direct force is the main cause, it must be supposed that muscular contraction has some effect in favoring the breakage of the bone. This, however, is not due, properly speaking, to avulsion; the arrangement of the cancellous structure is such that the triceps acts on the bony fibres partly by leverage, and partly by splitting them asunder. An examination of the diagram (Fig. 1) will explain this. Let

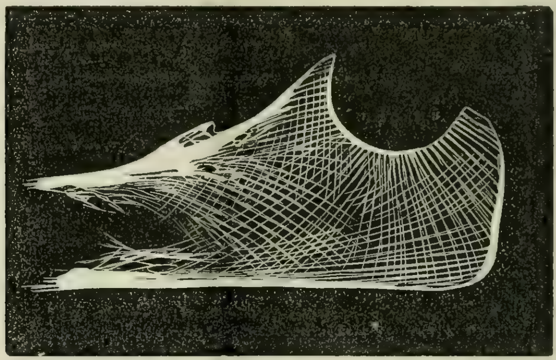

Fig 1.

it be remembered that in none of the cases of fracture by muscular action was the elbow known to be straightened at the time of receipt of the injury—nor do I know of its having been so in any case in which the olecranon was broken by direct violence. The ulna terminates above in a blunt extremity, nearly square, and irregular, the general plane of whose surface forms an obtuse angle with the axis of the bone, and the triceps muscle is inserted into a space at the posterior part of this surface. It is easy to see what an advantage this arrangement gives to the triceps, acting on a lever so short. At the posterior part of the section of the bone, the outer wall of compact substance is seen to divide into various columns, at less and less obtuse angles with it. Towards the tip of the olecranon, the bony columns are much more adapted to the

support of the concave articular lamella; so that as the olecranon is brought up, by any force whatever, against the humerus, the pressure is received on the ends of these columns of cancellous structure.

Following round the sigmoid cavity, we find that these supporting fibres are traceable, staying it up even to the tip of the coronoid process.

Such being the case, when the triceps is put into action it must tend, first, to break off the posterior outer wall of the bone, and the cancellous columns just within it, acting upon them as levers; and next, to split away a greater or less number of the radiating fibres which run toward the joint surface. And this, I believe, is the agency of the muscle in the production of fracture, whether or not it be aided by external violence. I do not know that any instance is recorded in which the line of breakage has terminated outside of the joint, as it must have done, it seems to me, in any case of so-called avulsion. In Hind's elaborate lithographic plate, intended to set forth the deformity in fractures of the olecranon and coronoid, the glaring anatomical error is committed of representing the triceps posteriorly and the brachialis in front as inserted into the tips of the olecranon and coronoid respectively; and the same mistake is copied in Gray's Anatomy, although the normal state of the parts is described with perfect accuracy.

Differences exist between different individuals in the extent of attachment of the triceps to the posterior surface of the humerus, low down, as well as in the strength and closeness of the fibrous structures surrounding the back of the elbow; and the degree of violence inflicted on the soft parts must vary widely. Hence the degree to which the broken portion of the olecranon is drawn up will be greater in one case than in another. The extent of its retraction is, I think, now generally admitted to have been overestimated by most writers.

One important argument for the extended position in the treatment of this injury, may be derived from a due appreciation of the anatomy of the part. The tendency of the contraction of the triceps must be to tilt over the upper fragment, so as to bring its tip into the greater sigmoid fossa of the humerus, and cause its broken surface to look either directly

downwards or somewhat backwards. Over this fragment we can exert very little influence, on account of the slight purchase it affords; but we can carry the forearm into a state of complete extension, so as to follow it, and bring the fractured surfaces as nearly as possible into apposition.

In any case of difficulty, I should be inclined to employ an instrument on the principle of Malgaigne's hooks for the patella—two short recurved hooks to be inserted into the posterior and upper angle of the olecranon, and fastened by any convenient method (adhesive plaster would, perhaps, be best) to the upper part of the forearm. With due care, all danger of penetrating the joint would be but imaginary. Anchylosis, as a permanent condition, need not be feared at all. But it must not be forgotten that experience has shown that even ligamentous union of a fractured olecranon is compatible with a very great degree of usefulness of the limb.

Fractures of the Coronoid Process of the Ulna.—Injuries of this kind are generally considered to be very rare; but, as Malgaigne remarks, they are "probably more common than one might suppose from the small number of published cases." Hamilton speaks of fourteen instances, ten of which were open to some doubt, having been only diagnosed during life; concerning the two of them seen by himself, he says that he was by no means certain. All the rest of the ten, except one, mentioned by Liston, were unsatisfactory in the accounts given of them. Liston's case, that of a boy who hung for a long time from the top of a wall, afraid to drop down, is familiar to all readers on surgery. Hamilton says that it "was simply impossible," but I think I can offer a sufficient rationale for its occurrence. The four cases established by dissection, although vaguely described, may be regarded as positive.

Let us look first at Liston's case, as a type of fracture of the coronoid by muscular action. Here the muscles arising from the inner side of the lower part of the humerus must have been strongly contracted, forcing the coronoid process backwards against the humerus. At the same time the brachialis anticus must have drawn forcibly upon the bone at its point of attachment. But by referring to Fig. 1 it will be seen that in such a state of things the cancellous structure would be at a

great disadvantage, and might be split off, as it were, by the wedge-like action of the trochlea, the wall of the shaft yielding below, as an overtaxed lever would.

Turning now to the instances (such as four of those recorded) in which indirect violence, by a fall on the hand, may be supposed to give rise to this injury, we can readily perceive how the same mechanism should obtain. Here, however, instead of the humerus being forced against the coronoid process by pure muscular contraction, it is driven forward by the weight of the body, while the ulna is arrested by the palm of the hand striking the ground. Very probably the muscles at the upper part of the forearm would aid in this; the brachialis anticus would not, unless the elbow were nearly at a right angle. In one of the cases recorded as verified by dissection—that mentioned by Hamilton as belonging to Dr. C. B. Gibson—the coronoid process is distinctly stated to have been broken off near its point. Perhaps I need not say that the same mechanism may be assigned for this accident, except that the action of the brachialis would of course have nothing to do with it.

I am inclined to urge this theory, since it seems to me to be altogether satisfactory as an explanation of the mode of production of the fracture. As to the proper course for the surgeon to pursue, I have nothing to offer, having never, to my knowledge, seen a case of the kind; probably, however, extreme flexion of the elbow would afford the best chance of perfect recovery, and even if false anchylosis should take place, the joint could at least be brought into a better position, and perhaps motion entirely restored at a later stage of the treatment.

As a matter of curiosity, I would mention that in Schmidt's "Jahrbücher" for 1865 (the exact reference has escaped me), there was noticed a memoir on fractures of the coronoid by a Continental surgeon named Lotzbeck, in which twenty-four (!) varieties of this injury were made out as follows: (1) Fractures uncomplicated with wounding of the soft parts; (2) those which are so complicated; (3) with fractures of other bones, but with no injury of the soft parts; (4) the same with such injury. Each of these four classes is divided into three species, according to the production of the fracture by direct or indirect force, or without any known influence of this kind; and these,

again, according to the existence or non-existence of luxation of the elbow.

Such thoroughly Teutonic elaboration of a matter, which at first sight would seem to afford so small a field of inquiry, can scarcely fail to challenge the wonder of the reader.

Fractures of the Bones of the Forearm.—Of all the constituent parts of the human upper extremity, the most essential to its ease, freedom and variety of motion, is the radius. Revolving around an axis corresponding above with the centre of its upper articulating surface, and below with the centre of that at the lower end of the ulna, this bone carries the carpus, and with it the hand, through the whole range of pronation and supination. Without stopping to comment on the wondrous beauty of this mechanism, let us grasp at once the surgical fact that, in all fractures of the forearm, it is this rotary freedom of the radius which must be maintained in order to effect a good result.

Various circumstances may give rise to conditions impairing this freedom.

When the radius alone is broken (we are not now concerned with fractures of its lower extremity) the original violence may drive the fragments inwards, causing them to form an angle salient towards the ulna. Or bad surgery, such as (in my opinion) the application of a bandage to the part before supporting it by a properly padded splint, may have the same effect; as would also the employment of too narrow a splint, allowing the bandage to bear across the seat of fracture. Neglect in the course of the treatment, the dressings becoming loose and ceasing to keep the fragments at rest, may result in like manner.

But I believe that the most fruitful source of trouble in these cases is muscular action, either producing displacement, aiding to keep it up, or reproducing it after its correction by the surgeon. Let us study the matter a little.

Suppose the radius to give way at any point between the limits of insertion of the pronator quadratus. The lower portion will, perhaps, be too strongly supported by its other connections, and afford too little purchase to be much influenced by that muscle; but the fibres inserted into the upper fragment

will *tend* to draw it across the interosseous space towards the ulna, and will be aided by the pronator teres above. And the mass of tissues in front of and behind the interosseous ligament at this part cannot offer a sufficient resistance to such a displacement. Only careful and judicious padding, with a proper position of the limb, can overcome it.

But suppose the fracture to affect the bone between the insertions of the two pronators. Here both fragments will be acted on, and an angle inwards can scarcely fail to be produced. It is true, the muscular mass at the inner side of the upper fragment is thick and comparatively firm; but a glance at the thin inner edge of the bone will show how trifling must be the resistance so offered.

If, now, we imagine the fracture to occur above the point of insertion of the pronator teres, we have the lower fragment not only drawn inwards, but tending to be rolled into pronation, while the upper is strongly supinated by the biceps and supinator brevis. Such a state of things is not theoretical only, but is clearly to be seen in a specimen in the Mütter Museum (No. 221). The supinator longus would act at too great a disadvantage to correct the position of the lower fragment.

In the specimen just spoken of, the line of fracture begins externally, just at the upper edge of the insertion of the pronator teres, and runs very obliquely downwards and inwards. A case[1] which I saw in April, 1856, at the Baltimore Infirmary, under the care of Dr. Miltonberger, illustrates still more clearly the point in question. Here the fracture, seated high up, was caused by the exertion of pulling very hard in driving a pair of young horses; and it seems to me to have been plainly due to torsion of the bone between the biceps and supinator brevis above and the pronators below.

Now, even although the hand be supinated in any case of fracture above the pronator teres, the lower fragment of the radius may be rotated to a sufficient degree to affect greatly the ultimate result, especially as the supination of the upper portion is limited only by the oblique ligament above.

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[1] Before reported, in my translation of M. Malgaigne's "Traité des Fractures," p. 483.

When the fracture affects both bones the sources of trouble may be very various. Both the upper fragments may be driven by the fracturing force towards one another, so as even to be wedged between the two lower ones.[1] Improper bandaging or splinting may cause the fragments of each bone to unite at an angle encroaching on the interosseous space. Or, the bones being kept parallel, an angle may be formed by both, backwards, forwards, outwards or inwards. It would occupy too much space, and is perhaps needless, for me to point out here in what way either of these deformities would hinder the free movement of the hand. A simple experiment with two bent sticks will suffice to show the exact difficulty in each case.

One other very curious condition of things is mentioned by Malgaigne as having come under his observation—the entanglement, namely, of the interosseous ligament between the fragments of each bone respectively, constituting an insuperable obstacle to reduction.

Practically, all these forms of displacement, so easily laid down in theory, are modified very much by the difference in level of the points of breakage in the two bones, and by the twisting the forearm is apt to undergo before the surgeon sees it. The important fact remains, and should never be forgotten, that the degree of restoration of movement depends upon the accuracy with which the fragments of the radius are kept in position. Only one thing can give trouble if this be insured, and that is the formation of exuberant callus, by reason of the difficulty of keeping the parts at rest.

With regard to the treatment of fractures of the forearm I have a few remarks to offer, based partly upon the statements now made and partly upon other facts to be mentioned.

In the first place, the preservation of the interosseous space is of the utmost importance. Mere extension will not always effect the disengagement of the fractured ends. Often it will be found advisable, especially in children, to give an anæsthetic, in order to allow of a complete and accurate examination and adjustment of the parts. The surgeon should arrive at

[1] Malgaigne, op. cit., p. 588; translation, p. 473.

the most precise knowledge possible of the seat and direction of the fracture, and restore the normal state of things by moulding with his fingers. Splints should then be applied, one on the dorsum and the other on the palmar surface of the forearm. Each of these splints should be carefully padded, so as to make pressure over the interosseous space. It is a good plan to surround the splints and the part with two or three broad strips of adhesive plaster, before putting on the bandage, so that this latter can be removed for the subsequent examinations with less risk of disturbing the fracture.

As to the position to be given to the limb, I believe that (except when the radius alone is broken above the point of insertion of the pronator teres) this should invariably be that of semi-pronation. For we thus get, (1) the interosseous space at its widest; (2) the ulna and radius most accurately parallel; (3) the most comfortable posture for the forearm during its confinement. And in unfavorable cases, should exuberant callus be formed, or any other circumstance impair the movements of the arm, this is the position in which the greatest degree of use of it can be acquired.

The elbow should, for obvious reasons, be semi-flexed. Very often, and especially in children, restless adults, or in cases of bad compound fracture, it will be well to use, for the palmar splint, the ordinary right-angled inside arm splint, reaching from the axilla to the ends of the fingers. This keeps the forearm accurately semi-proned, and gives a greatly increased degree of firmness.

By very carefully cutting out the ulnar edge of the palmar splint, so as to give it the correct outline of that edge of the forearm and hand, adding, if necessary, a strip of stout leather or pasteboard tacked along it, we may obviate all risk of an angle inwards. Moreover, by allowing the hand to fall into abduction, this greatly adds to the patient's comfort.

When the fracture becomes somewhat firmly united, say at about the twentieth day, we may gain time by cutting off the part of the splint corresponding to the fingers, and putting on a palmar block, like that in the well known Bond's splint, so that the patient may begin to work the fingers a little.

If the radius alone is broken above the insertion of the pro-

nator teres, the supine posture is preferable, since the upper fragment will be rotated outwards by the biceps and supinator brevis, and we must try to make the lower one follow it, lest the freedom of supination should be subsequently impaired. Here, however, no padding of the interosseous space must be used, since this would so press upon the pronator teres as to tilt the upper end of the lower fragment inwards and cause an awkward angle, which would hinder pronation.

But if both bones are broken, no matter at what point, I believe it is decidedly the best practice to keep the forearm semi-prone, since the supine posture would not only destroy the interosseous space, but would endanger the formation of an angle in each bone, and the worst possible relation of the fragments for the future usefulness of the limb. Here we must give our whole attention to the maintenance of the interosseous space, and of the line of each of the bones—warning the patient that some freedom of motion will probably be lost by unavoidable rotary displacement of the radius.

Fractures of the shaft of the ulna alone offer no special points of interest.

Inflammation of the Cavity of the Tympanum, and its Relation to the Exanthemata. By O. D. Pomeroy, M.D., Lecturer on Aural Surgery at the College of Physicians and Surgeons.

(Read before the Academy of Medicine September 19, 1866.)

The object of this paper is to show the great frequency of ear diseases, which may be traced to a former attack of some one of the graver exanthematous diseases, more especially scarlatina and measles, and to give a sketch of the pathology, diagnosis, and treatment of such cases.

It has been a question whether inflammation of the middle ear originated from an inflammation of the external auditory canal and membrane, thus passing inward, or from inflammation of the throat, passing outward by the Eustachian tubes. Able aurists have entertained opposite opinions upon this point. The weight of authority is, however, in favor of the view that the throat is the starting point of most of the inflammations of

the middle ear, and especially is this the case in the impairment of hearing following the exanthemata.

In most of the exanthemata there is inflammation of the throat, and this, if allowed to go unchecked, will result in deafness, either partial or complete, and in very many cases this deafness becomes permanent. In support of this view we may quote a few authorities. Troltsch says:

"We often find evidences of this disease on the dead body in children; then we observe it as a participant and consequence of the exanthemata, measles, scarlatina, small-pox." After relating symptoms, he further says: "You will see that such symptoms as these occurring in an exanthemata or typhus fever, and which can only be referred to the ear, will be little observed in consequence of the danger from the general condition of the patient, and in their beginning probably never referred to the correct source." Again: "Simple chronic catarrh occurring in typhus fever is quite common, as in scarlatina and roseola. Very few physicians can bring themselves to pay the least attention to the ear in the constitutional diseases of which we have been speaking, and they are the very ones in which its functions are most apt to be disturbed. Never are ear affections so completely disregarded and placed in the background as in those affections which confine a patient to bed."

Dr. Edmund Clark, of Boston, is quoted by the same author in these words: "So necessary is a careful attention to the ear during the course of an exanthema, that every physician who treats a case without careful attention to the ear must be denominated an unscrupulous practitioner." Dr. Troltsch again says: "Aural inflammations in scarlet fever and measles furnish the greatest number of the inmates of the deaf and dumb asylums, as well as a large portion of our cases of deafness of a high grade, in consequence of the readiness of the ear to participate in the exanthemata, and, as we must confess, from the complicity of the physician in neglecting the complication." Of 200 cases of ear trouble of all kinds that came consecutively under his notice, Mr. Wilde reports 28 as having been caused by some one of the exanthemata. Mr. Wilde further remarks: "I must again repeat what I have already mentioned, that

practitioners do not sufficiently attend to the state of the ear in scarlatina, and that they neglect the application of remedies for a disease which is, even in the unhealthy condition in which the patient usually is at the moment, amenable to treatment, and omission of which has, in numbers of instances, led to permanent deafness, and, when the patient is young, to consequent muteism." And again: "From the latest authentic Continental tables, those published by the Belgian government in 1847, we learn that in 1,892 cases of acquired muteism from all causes, 216 were from scarlatina, 80 from measles, and 28 from small-pox; from the American tables, out of 86 cases of non-congenital muteism, as many as 41 were from scarlatina; and, according to the investigations in which I have been engaged under the present Census Commission in Ireland, I find that of 394 cases of specified causes of acquired muteism, in 35 instances it arose from scarlatina, in 12 from small-pox, and in 7 from measles; in all, 54 from exanthematous otitis, or one in $7\frac{1}{3}$ of the whole; and I am inclined to think that this proportion is even less than what actually exists, for many cases were returned as diseases of the ear, or a discharge from the ear, acquired, no doubt, during some of those febrile disorders just specified. The most unmanageable cases of otorrhœa which I have met with in practice, those in which most destruction has taken place, and where the ossicula have been most frequently lost, have been the result of scarlatina or measles." Kramer, Lincke, Pilcher, and Harvey, of London, concur with the above.

The inflammatory process, as I have said, commences in the mucous lining of the throat, and extends up the Eustachian tube to the middle ear; if it is a light attack it soon subsides, leaving the mucous membrane slightly thickened, and doing little harm; but we often have an excessive thickening of the membrane, so great as to occlude the Eustachian tube, and to render the membrana tympani rigid, so that it vibrates feebly or not at all when impressions act upon it.

More than this, we may have an anchylosis of the chain of small bones, partially or entirely interrupting vibrations. Owing to an exhaustion of air from the middle ear, the membrane is often sunken by the external atmospheric pressure

(there being no counter-pressure on the internal surface) to such an extent as to fall in upon the promontory or internal wall of the tympanum. The inflammation not unfrequently extends to the mastoid cells, closing them, and producing a smaller vibratory chamber than is consistent with the integrity of the organ. The internal ear is often rendered useless, as a portion of the auditory apparatus, by the extension of inflammation into its complicated structure, disturbing the delicate equilibrium upon which its integrity depends.

A more common form of inflammation—namely, that which leads to perforation of the membrane and consequent otorrhœa, with ulceration of the contiguous parts—is more to be dreaded as its results are, in many instances, destructive to the hearing power, and, in the event of its extending to the brain, through the thin septa of bone at the superior portions of the cavity and mastoid cells, life itself may be endangered. Another result of the inflammation is, impairment of the integrity of the auditory nerve. This is, undoubtedly, a not uncommon cause of deafness, as inflammatory affections of the optic nerve are of blindness. Like its congener, the optic nerve, it is subject to atrophy, to infiltrative products of inflammation, and to various other degenerations. By the excessive filling of the tympanum with inflammatory products, the membrane is often ruptured, or it is slowly ulcerated away, and we have the very common result of a purulent catarrh of the middle ear. If the inflammatory process is of the dry order, as in milder cases, we probably will not obtain a ruptured membrane, or any destruction of its substance; but it will generally be found thickened and infiltrated with inflammatory products, as lymph, fibrine, etc. The external appearance is usually a sunken drum, for the reason before assigned, and is indicated by undue prominence of the handle of the malleus, by alteration of the light point, lines and ridges, or by spots of fibrous or lymphy exudations traversing the superficies of the membrane, and an opaque appearance, often resembling ground glass, and very unlike the pearly gray translucency of the normal drum. It may be pertinently inquired, how are we to know that the middle ear is inflamed without seeing it? I answer, the inflammation of the membrane in

its deeper layers, its sunken and altered appearance (which cannot be occasioned by external inflammations alone, or at least rarely), occlusion of the Eustachian tubes, deafness out of proportion to the visible symptoms, a feeling of fullness in the inside of the ear, and the history of the case, will determine whether the inflammation is mainly of the middle ear or of the drum-head itself.

In the differential diagnosis between diseases of the middle and the internal ear or labyrinth, we shall find greater difficulty. In treating a case of deafness with its concomitant symptoms, if we find, after a while, that the impervious tube is fairly opened, and that the middle ear easily inflates, and the membrane presents the normal elasticity, as evinced by its slight outward movement upon inflation; if there is no evidence of fluid in the cavity of the tympanum, and there still remains much or most of the former trouble, we may infer that the difficulty is in the internal ear. It will be seen, therefore, that the accurate diagnosis of diseases of the ear, which are out of sight, is difficult. It may, also, be asked, how are we to know of the commencement of any obscure aural affection, during an acute disease of considerable gravity, when the symptoms of the general affection are much more noticeable and severe than the not easily observed symptoms of ear trouble, especially if the patient is, as is the rule, a child or infant? This is a question not easily answered. If the patient be a very young child, it tosses its head about, it starts in sudden fits of crying, or screams outright, as though suffering acute lancinating pain—symptoms which, it is true, are common to other than ear diseases. If attention is directed to the ears, there may be no signs of inflammation of the membrane of the drum, or tenderness about the auricle pointing to trouble with the external ear; the throat will, however, be found inflamed in the majority of cases of the exanthemata, although a large number may escape serious ear complications. It is evident, then, that there are cases in which the diagnosis cannot be made out with certainty; but it will be advisable in such to treat the patient as though the ear trouble had been detected. It may be replied, we have often observed deafness, pain in the ear, otorrhœa, and the like, supervening upon

ear trouble, which was only temporary, the disease in many instances being self-limited—scarcely requiring treatment. This, undoubtedly, has much of truth in it; but suppose we treat all cases in this way, we have the result I have before stated, in very many instances. What cases are to be of the self-limiting variety, and what of the mischievous, cannot always be told beforehand. Thus we see the necessity of carefully treating every case of incipient ear trouble when occurring as the sequela of other diseases.

Treatment.—The indication in treatment is to subdue, by proper antiphlogistics, the *inflammation*, which is the sum total of the disease. The pain, which is so characteristic a symptom, may be relieved by leeching the external meatus, by pouring a few drops of Magendie's solution of morphine into the external canal, or by the continued application of warm water (which not only allays pain, but tends to lessen the inflammation). Dry or moist warmth may be applied to the auricle by means of cloths, or any convenient method. Poultices should not be long continued, as they predispose to otorrhœa by their macerating effect upon the canal and membrane. The old domestic remedy, a roasted onion, is often serviceable; it contains as well as retains a large amount of heat and moisture, which are so acceptable to an inflamed ear. Its stimulating properties may be theoretically objectionable, but scarcely so in practice; more than this, we must prescribe agents which are likely to be used. A certain class of patients would have no confidence in the warm water, and of course would not give it a fair trial, while on the contrary the onion would warmly appeal to their sympathies and confidence. A bag of hops, moistened and heated, applied to the auricle, is often serviceable. Stimulating applications, such as chloroform, laudanum, ether, camphorated oil, etc., should be avoided, as being too irritating to the part. The old practice of stuffing the ears with cotton or wool, so as to prevent the egress of every particle of secretion, is much to be reprehended. Air or cold is undoubtedly injurious to the organ of hearing when in a state of inflammation, and it would be proper, therefore, to apply a handkerchief or bandage loosely about the auricle. Counter-irritation behind the ears should immediately follow these means, and be continued until the

symptoms have subsided, even if lasting several weeks. In a case where the major part of the inflammation occupies the Eustachian portion of the cavity, and quite likely of the tube itself, we would expect a greater relief from the application of the counter-irritant to the throat rather than to the mastoid region, it being nearer to the diseased part.

Inflammation of the throat, of course, is always to be promptly attended to, and if the Eustachian tubes be closed they must be opened by the common method of forcible expiration while the mouth and nostrils are closed, or by Politzer's plan, which is as follows: A rubber air bag of from 8 to 10 oz. capacity is attached to a flexible tube tipped with a nostril piece; the patient is asked to hold a little water in the mouth; the surgeon applies the tube to one of the nostrils, carefully closing the other; he then directs the patient to swallow, during which act air is forcibly expelled from the air bag and passes up the Eustachian tube to the cavity of the tympanum. The muscles concerned in deglutition by their contraction cause the faucial extremities of the Eustachian tubes to open, thus admitting the more free passage of air.

Inflating the tympanic cavity with air, vapor of water, or medicaments in a gaseous form, has from time immemorial been by a certain number of the profession regarded as appropriate treatment. In the acute stage of this affection, although many recommend it, inflation of the cavity seems to me a very painful and useless procedure. What advantage do we hope to derive from inflating the cavity of the tympanum? I answer: 1st. To render pervious a more or less impervious Eustachian tube; I do not refer to a stricture, for nothing but an Eustachian bougie will dilate it, but where there is some temporary obstruction, such as mucus, pus, etc. 2d. To press outward the sunken drum-head, and by such movement of the membrane to break up any adhesions which may have formed between the membrane and the internal wall of the cavity of the tympanum. 3d. To remove secretions from the drum, either through a perforate membrane or by the Eustachian tube, from the elasticity of the air forced into the cavity. 4th. To produce the specific *effect* of the injection upon the mucous membrane lining the drum, as in the case of the medicated air, vapors, gases, etc.,

although air alone may act curatively. This inflation should be continued daily until the indications for so doing no longer exist. With many medicated vapors or gases, Politzer's plan, with a Buttles' inhaler, adapted to the nostril, is the most convenient.

This inhaler, devised by Dr. M. S. Buttles, of this city, consists of a hollow cone, in which a sponge is placed, being first moistened by the medicament, and open at either extremity to admit of the free passage of air through it, which, of course, becomes more or less laden with the medicament. (Tr. iodine I have usually used in this apparatus, although chloroform, ether, aqua ammoniæ, ol terebinth, tr. camphor, etc., may be used.) This combination was first adopted, I believe, by Dr. Roosa, of this city. If the case cannot be managed except by the catheter, a flask must be adjusted to it, from which the gas or vapor is formed. The muriate of ammonia, heated to about 212° Farenheit, is usually preferred, which is forced into the ear by an air pump or rubber bag. If the catheter alone fails to render pervious the Eustachian tube, a bougie may be passed through the catheter into it, so as to dilate any stricture which may be present, and break up any adhesions within the cavity. This is, however, very difficult, and in many instances hazardous, as the ossicula have been disarticulated by the passage of a bougie into the cavity. Moreover, it is a very difficult manœuvre, and should be attempted only by a skillful hand. I hardly think it proper to attempt the air bath until the acute symptoms have subsided, for pain and aggravation of the trouble may be occasioned by adding to the intra-aural pressure already existing; and it is comparatively harmless for the tube to remain impervious for a limited period, as nature is prone to open it by means of coughing, sneezing, etc. (The object of the aëriform medicament, of course, is to act on the inflamed mucous membrane.)

I do not know that any constitutional treatment is necessary beyond attending to the secretions, allaying any undue febrile movement, etc. Mercury I am inclined to believe to be comparatively useless in any stage of the disease. As most obstinate cases of aural disease of this character require tonic and supporting treatment, we see in this a contra-indication for

the use of mercury, unless we admit the tonic effect of "small alterative doses of the bichloride."

When the membrane is ruptured, a persistent otorrhœa is the consequence; and is best treated by a two gr. solution of acet. plumb., or tannic acid dissolved in glycerine, at the rate of from ten to sixty grains to the ounce; or alum, sulph. zinc, and other astringents of this class, of about the same strength as the acetate of lead solution. Of course the utmost cleanliness, by means of syringing with warm water, must at all times be insisted upon. A granular surface may be touched by nitrate of silver of sufficient strength to whiten the part, which is best done by using a solution with a small camel's hair pencil, or a bit of cotton rolled upon a small stick, or the solid nitrate may be fused upon a probe, and thus applied. Larger granulations may be cautiously touched by nitric acid. Even at this stage it may be proper to blow air through the Eustachian tubes, both to remove secretion and keep the tube pervious. In old cases, which have resisted other treatment, stuffing the cavity with cotton wool has been practiced, on, perhaps, a similar theory to the cure of indolent ulcers of the leg by strapping. I have used it in quite a number of cases, and it seems worthy of further trial. In order to succeed care should be taken to first perfectly cleanse the part by introducing small pledgets of cotton, and then to pack the wool carefully into the cavity by means of forceps and probes, avoiding the filling of more than the cavity, as pain would be occasioned by extending the stuffing into the canal. This may remain one, two, or three days, according to indications. If there is much discharge, it will not be judicious to allow it to remain so long; or, if pain is produced, it should be removed at once. I have generally found great comfort to result from this operation.

The Treatment of Fracture of the Lower Jaw by Interdental Splints. By THOMAS BRIAN GUNNING, New York.

[Continued from October No., p. 29.]

Of the cases published in October, to illustrate the principles given in the preceding number of the JOURNAL, one was still under treatment.

In this case (No. 7), the jaw was broken between the left bicuspids and through the socket of the right wisdom tooth. A splint was applied, Aug. 25th, 1866, and both fractures did well up to Sept. 15th, when grave displacement set in. The treatment by which it was overcome is now shown.

Sept. 18th. Pus again discharging profusely from the right fracture. Patient says, the bone moves; he points to the coronoid process. When the temporal and masseter muscles are brought into action, crepitus can be distinctly felt, especially if the finger is placed on the left angle where there is no swelling.

Sept. 20th. Displacement of the right ramus outward, forward and upward.

Sept. 21st. Swelling and pain increased since yesterday. On removing the splint, I find good but flexible union on the left side; the right fracture proves to be very oblique and diagonal to the thickness of the bone; it commences outside the second molar, passes through the socket of the third (the extracted tooth), and terminates somewhere on the inside, short of the angle. Since Sept. 5th, when the wisdom tooth was extracted, this fragment has had nothing to hold it back in place, except the roughness of the fractured surfaces, which may have given way under the action of the unusually strong muscles and the jarring of a severe cough. When describing the splints before the Academy of Medicine, I suggested that, when necessary, metallic points could be arranged in them to go into the bone. I now decided to apply one in this case, for as the line of fracture averages three inches around the bone, a salient edge, one inch and a half wide on each fragment, is pressing into the periosteum and other tissues. This can all be remedied by the aid of a piece of wire, which may go into the muscles, etc., perhaps a quarter of an inch, and press against the bone even less than that. A steel hook was, therefore, screwed into the end of the splint, just below the back corner of the upper wisdom tooth. The wire is a line in diameter and three-quarters of an inch long, clear of the splint. It is bent, so as to go down outside the bone where the ramus starts from the body. The point of the hook goes through the buccinator muscle and rests firmly on the

bone. Firm pressure on the splint forced the ramus back, and the splint went on to the upper teeth, but at the expense of carrying the front of the lower jaw too much to the right, as the overlapping of the fragments did not yield readily. Pack-thread was passed around the right bicuspid and canine, and after drawing the front of the jaw to the left for ten or twelve minutes, the fragments came into position and the teeth went up in the splint. The bone was then quite firm, the action of the muscles causing no motion in it whatever.

Pain was felt for several days near the condyle and in the front of the ear, with occasional stinging in the temple; but this, with the swelling and suffering of the previous displacement, rapidly passed away.

Oct. 4th. All the parts are looking better than at any time since the injury. The pus is much diminished, and the bone is held quite still.

Oct. 8th. Only a little pus to be seen, but a piece of the alveolar which lies in the gum on the outside of the right second molar is nearly detached. No motion has been felt in the ramus since the hook was applied.

Oct. 11th. Removed the loose piece of alveolar easily.

Oct. 19th. Patient failed to call on the 15th and 18th, but came to day, quite drunk. The splint is firm, however, and the bone doing well.

Oct. 26th. His wife called and said he had been in jail since the evening of the 19th, and that for a week previous he had been drunk nearly all the time. She was afraid his jaw was injured, as he had thrown himself about very much and vomited frequently.

Oct. 28th. I called at the prison. He looks thin and pale, but the jaw is doing well, and the splint secure.

Nov. 24th. He has been out some time; I removed the splint to-day. The left side of the jaw is quite strong and there is good but flexible union on the right side. The hook has been worn sixty-four days without a moment's intermission; the hole left in the gum is just the size of the wire and the parts around are quite healthy. Splint dispensed with.

Dec. 10th. The callus has stiffened very much since the splint was left off, and both sides of the jaw are now used in eating.

In this case neither weight nor distension could have displaced the bone, for the ramus was drawn upward and the swelling had subsided. The temporal and associate muscles must therefore have been the only cause of the displacement, although opposed by the body of the jaw, which was held still by the splint. This case, therefore, with the others used to illustrate the treatment, shows that the muscles are active causes of displacement, as distinctly intimated by me throughout the subject, and formally stated in the paper read before the New York Academy of Medicine, June 1, 1864.

Other cases treated and seen by me also demonstrate that the opinion expressed so decidedly by Malgaigne and entertained by Hamilton, as to the effect of the impulse given by the cause of fracture upon displacement, is erroneous. For the impulse being exhausted in deciding the position, direction, and extent of the injury to the bone and surrounding tissues, the bone is then *surrendered* to the muscles which affected it before and at the time of fracture, and still continue to do so, according to *the condition in which it and they are left.*

In view of the importance of correct opinions upon this subject, my next paper will be upon the muscles which control and influence the lower jaw.

The Sphygmograph.[1] By MEREDITH CLYMER, M.D.

The value of the sphygmograph—*σφυγμη, pulse, γραφις, a style*—for the purposes of physiological research has been for some years universally acknowledged. Its application to the investigation of disease is only beginning to attract the notice of the profession. By it a permanent record of the pulse form is photographed, as it were, by a series of zigzags, written upon a sheet of paper. It tells, by means of beautiful

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[1] Physiologie Médicale de la Circulation du Sang. Par le Dr. E. J. Marey. Paris, 1863. On the Use of the Sphygmograph. By B. W. Foster, M.D. London, 1866. On the Application of Physical Methods to the Exploration of the Movements of the Heart and Pulse in Disease. By J. Burdon-Sanderson, M.D., and Francis E. Anstie, M.D. The Lancet, Nov. 1866.

and simple mechanism, the frequency and regularity of the pulsations of any vessel to which it may be applied, and enables us to see at a glance peculiarities and differences in the series, or in any single pulsation, so minute that the most delicate and practiced finger would fail to recognize them. The sphygmograph was invented and named by Vierordt, as an aid in the study of the physiology of the circulation; but the instrument now used is one materially modified and improved, almost re-made, by Dr. E. J. Marey, of Paris, so distinguished for his admirable experimental researches upon the physiology of the circulation, and their practical application to clinical medicine.

Marey's instrument may be briefly described as consisting of: (1) a steel spring, whose free end, covered with a convex plate of ivory, rests upon the artery to be examined, and by virtue of its elasticity exerts a certain degree of pressure upon the vessel. Each pulsation slightly raises the spring at its distal extremity, and the multiplication of the movement is obtained by means of (2) a very light lever, L, which moves upon a pivot, the rise of the spring being transmitted to the lever, very near to its centre of motion, by (3) a bar of metal, bent at right angles, so as to form two limbs of unequal length, the horizontal one being two-thirds longer than the vertical one, which latter terminates in a point. The vertical arm of the bar is pierced by a screw, which, when it acts, establishes a connection between the spring and the bar, and the movements of the former are transmitted to the latter, and through its vertical arm to the lever. To insure the transmission of the movement, the short arm of the bar must be in contact with the under surface of the lever, and this is effected by means of the screw V, which also regulates the interval between the point of the short arm and the under surface of the lever, as well as the amount of pressure exercised upon the artery by the spring. The lever carries at its free extremity a little pen, which, filled with ink, registers its movements upon the paper, covering a plate, and this plate is moved at a uniform rate forwards by means of watch-work, H, placed beneath in the case. The passage of the plate takes ten seconds; the watch-work is wound up by a button, and a small regulator starts and stops the plate. The

instrument is applied to the arm, when the radial pulse is to be explored, by elastic bands, a pad being previously placed on the under surface of the limb for the greater comfort of the patient, and to take off the pressure of the bands.

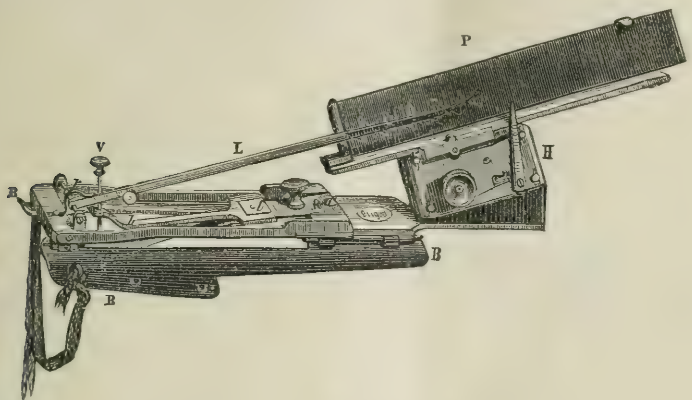

Fig. 1.[1]

Sphygmograph of Marey. When fixed upon the forearm, the spring under V is directly over the radial artery. The movements of the pulse are transmitted to the long and light wooden lever L, and registered on the plate P, which is moved at a regular rate by the clock-work H.

The tracings of the pulse-form are a literal transcript of physiological facts, and these should be understood before the record can be read aright, and to prevent error the mechanics of the circulation must be known. The researches of E. H. Weber (1833) established that the pulse took its origin in the sudden stretching of the aorta by the pressure of the blood injected into it by the contracting ventricle, and that it is propagated along the arteries in the form of a wave. It set aside, by direct experimental observations, the tidal theory of Bichat, who held that all pulses were synchronic—which was subsequently shown by physiologists to be incorrect—and proved that there was an appreciable interval between the contraction of the ventricle and a pulsation in any artery, and that it was in proportion to the distance of the part explored from the heart. Vierordt,

[1] We are kindly permitted to take this figure from Prof. A. Flint's, Jr., work on "The Physiology of Man," published by the Messrs Appleton of New York.

Chauveau, and Marey mainly developed the physiological facts growing out of Weber's theory. The aorta in man cannot be directly examined, but it may be assumed that the wave or pulse of the carotid or subclavian arteries, from their size and proximity to the aorta, is practically identical with the primal wave. A pulse-trace as recorded by the sphygmograph (Fig. 2), is made up of a series of curves, each curve corresponding to

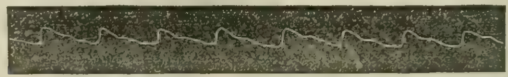

Fig. 2 (Marey).

a complete cardiac revolution, and is called the *pulsation*, which is composed of three parts, viz.: the line of *ascent*, the *summit*, and the line of *descent*. The first part coincides with the period the heart and aorta are in communication—the systolic period—the beginning of which is marked by a sudden, upward jerk of the lever, indicated in the tracing by a nearly vertical line; then comes a slight fall followed by a slighter upward jerk, tokening the closure of the valves and arrest of the communication, and marking the second part or *summit;* the lever remains stationary for an instant, and then suddenly falls—the third part, or *descent*. The line of *ascent*, caused by the flow of blood into the vessels after each cardiac systole, tells, by its form, the manner in which the blood enters the aorta. The more rapid the afflux the more vertical will be the line of ascent. When the blood enters slowly, from any hindrance, the line of ascent is oblique, and sometimes of a curved form. In certain disorders of the heart and vessels, the line of ascent is of a mixed form, the first part of the trace being vertical and the rest curved. When, under certain conditions, the mass of the blood in the ventricle during contraction is thrown into rapid vibrations, the ascending pulse-curve is interrupted by a series of notches, each corresponding to a vibration. The *summit* of the trace marks the moment when the afflux and efflux are exactly equal, and it may be so short as to be a mere mathematical point between the lines of ascent and descent, or of such duration as to make the summit a horizon-

tal line of some length, or it may be formed by an ascending or descending plane, according as the afflux is greater than the efflux, and the reverse. A little hooked point sometimes precedes the summit, and becomes a valuable element of diagnosis. The *line of descent*, corresponding to diminished pressure in the arterial system, marks, by its degree of obliquity, the rapidity of the fall in the pressure, and indicates the facility of the passage of the blood. Its form may vary very much, being sometimes purely oblique, occasionally with a curve whose convexity is upwards, or it may have one or more undulations—this last character indicating what is called *dicrotism* (Fig. 3);

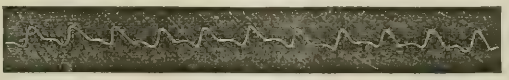

Fig. 3 (Marey).

which term it has been proposed to limit in sphygmography to the undulations seen in the line of descent, to distinguish them from those met with at times in the line of ascent, which have a different diagnostic signification. The degree of abruptness in the line of descent depends on the amount of aortic regurgitation, and the swiftness and completeness of closure of the sigmoid valves.

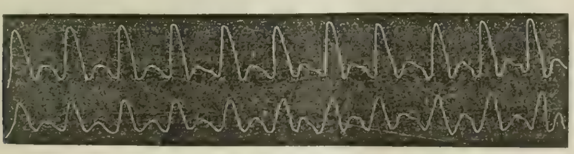

Fig. 4 (Sanderson and Anstie).

Carotid and radial tracings of a male, æt. 25, with phthisis in third stage, showing some of the more striking differences between the pulse-curves of the two arteries, particularly the greater duration of the systolic distension in the carotid than in the radial, the peculiarities due to the propagation of vibrations from the heart, and the notch or angle by which the moment of closure of the aortic valve is indicated. The arterial pressure is low. Upper line carotid, lower, radial tracing.

In the great vessels pulsation is produced by a simultaneous *increase of tension* and *acceleration of movement*. In the more distant arteries, these two effects are no longer coincident, for though transmitted, they tend to separate more and more from

each other the further they are noticed from the heart Fig. 4).

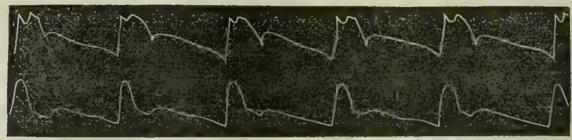

Fig. 5 (Sanderson and Anstie).

Tracings obtained by the successive application of the sphygmograph to the carotid and radial arteries of a male patient, convalescent from lead colic. The upper line is the carotid tracing, the lower the radial.

With regard to the radial pulse: (1) The propagation of the systolic acceleration, if it happens, causes a rapid expansion of the artery, which is synchronous with the ventricular systole, and is immediately followed by collapse. (2) The propagation of the systolic pressure-wave gives rise to a gradual expansion of the artery, and follows the systole after a variable interval. (3) When the resistance due to the mean arterial tension is considerable, the acceleration extends only to the great vessels, so that its effects at the wrist are imperceptible, and the pulse-tracings are wave-like. When arterial tension is lessened, the elevation of the lever from systolic acceleration is abrupt, but of short duration (Burdon-Sanderson) (Fig. 6).

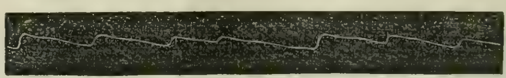

Fig. 6 (Foster).

Radial trace, showing effect of long interval, and consequently low pressure, in amplitude of the pulsation.

Degeneration of the arteries, so common in old age, is indicated by certain forms of the pulse-trace (Fig. 7). The chief

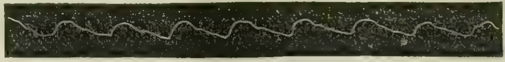

Fig. 7.

Showing senile change in the vessels, loss of elasticity, and absence of dicrotism.

characters of the senile pulse are: great amplitude of the trace; a vertical and sometimes broken line of ascent; a sudden fall of the first part of the descent, and an absence of dicrotism. These peculiarities are due to dilatation of the vessels, their lessened

elasticity, and to increased energy of the ventricle. They are found in a less degree, sometimes, at an earlier period of life, and betoken the presence of arterial change. The rounded summit and decreased dicrotism are, when well marked, the first signs of diminished arterial elasticity, and the beginning of arterial change.

The pulse-trace in *aneurisms* shows the modifications in the movement of the blood produced by the diseased condition. An aneurism of the subclavian artery was detected by means of the sphygmograph, when it was impossible to make out the diagnosis by the usual methods of investigation (Burdon-Sanderson and Anstie, *The Lancet*, January 20, 1866). These modifications depend on the site of the tumor, its size relatively to that of the diseased artery, and the elasticity of its walls to properly study the pulse-traces. Marey divides aneurisms into two classes: (1) When their site is such that the pulse can be explored on the involved vessel at some point below the tumor; (2) Those of the aorta. 1. The pulsation of an *implicated artery* below the tumor is weakened and generally retarded, the sac modifying the movement of the fluid. The sphygmograph shows that the modifications of the pulse are both in its form and its force; the movement of the blood in the vessel is more like that in the smaller arterial branches in a natural state. The vertical line of ascent disappears, and often approaches in length that of descent. 2. In *Aneurisms of the Aorta* the indications given by the pulse-traces are less marked. Marey has found the force of the pulse generally but little decreased. Changes in the dicrotism may be present in one or both radial pulses, and is occasionally a sign of value. The most valuable sign is a constant dissimilarity in the pulse-traces of the radial arteries, which is shown either by a slight difference in the dicrotism only, or by evident difference in the form.

In Valvular Diseases of the Heart the sphygmograph increases the accuracy of the diagnosis. The pulse-trace in *aortic obstruction* shows an obliquity of the line of ascent, indicating a prolonged ventricular systole, and the gradual entrance of the blood into the aorta. Insufficiency of the sigmoid valves—*aortic regurgitation*—produces pulse-traces of a striking character. There is great amplitude, due, according to Marey, to

the feeble tension of the artery, in consequence of regurgitation during the ventricular diastole; the vertical line of ascent, marking the sudden ventricular contraction, ends in an acute, pointed process, indicating that the lever, from its sudden and accelerated elevation, has for a brief interval lost its connection with the arterial movement; the summit is often very short, but may be a curved or horizontal line, as in cases where there is narrowing of the aortic orifice, or the passage of the blood into the vessels is from any cause hindered (Fig. 8).

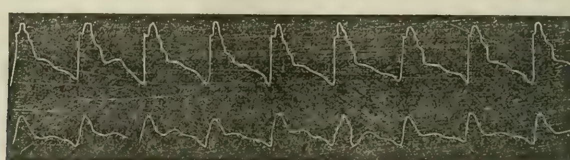

Fig. 8 (Sanderson and Anstie).

Carotid and radial tracing in a patient, æt. 23, with mitral and aortic disease. Upper line carotid, and lower line radial tracing.

The very irregular pulse of *Mitral Regurgitation* is characteristically recorded by the sphygmograph. If there is coincident narrowing of the auriculo-ventricular orifice, the irregularity of the pulse-trace of pure mitral regurgitation is less.

The pulse-form in acute diseases is now being intelligently and carefully investigated by several competent observers—notably by Drs. Burdon-Sanderson and Anstie, of London. The results yet made known are encouraging, and promise that the sphygmograph will become a received instrument of clinical diagnosis and a valuable aid in prognosis. These researches have not, however, reached such a development, especially as regards the true interpretation of the sign language, which the instrument writes with the accuracy of the electric telegraph, to warrant absolute rules being yet laid down.

The constancy of form in the tracings from the same individual at different times, under the same physiological conditions is remarkable, shows the trustiness of the sphygmographic record, and, as Dr. Burdon-Sanderson remarks, "however imperfectly we may as yet be able to interpret it, we may confidently hope that it will some day help us to arrive at a more perfect knowledge of those individual peculiarities of healthy constitution which we now neglect for the want of the means of appreciating them."

PROCEEDINGS OF SOCIETIES.

NEW YORK PATHOLOGICAL SOCIETY.

Stated Meeting, September 26, 1866.

Dr. Frank H. Hamilton, President, in the Chair.

SPINA BIFIDA—DR. A. KOEHLER.

Dr. Koehler presented a specimen of spina bifida which he removed from a male child, who died twelve hours after birth. The labor of the mother was an irregular one, the child being born by a breech presentation. It was well developed, except in the lower extremities, which were greatly atrophied from the knees downward. The deficiency in the development of the spine was confined to the lumbar region, and involved the nerves of that part. The sac was ruptured at the time of birth, and death was doubtless occasioned by paralysis of the intestinal tract.

Dr. Post remarked that the specimen was an interesting one, as showing the spinal nerves involved in the sac. This fact was of special importance in reference to one of the plans of treatment proposed for this affection, viz., exsection of a portion of the sac. In a case like this, exsection would, of course, involve the destruction of these nerves. He supposed that death was occasioned by the extensive opening of the cerebro-spinal canal, and the consequent exhaustion arising from the sudden escape of the cerebro-spinal fluid.

CHRONIC PROGRESSIVE OSTITIS, OSTEO-MYELITIS, AND PERIOSTITIS OF THIGH AND LEG—NOT TRAUMATIC—REAMPUTATION AT HIP JOINT, BY DR. F. H. HAMILTON—DEATH ON THE SEVENTH DAY, PROBABLY FROM PYÆMIA. REPORTED BY DR. HAMILTON.

John Schmidt, æt. 28, German. Admitted to Bellevue Hospital, July 16, 1866, in service of Dr. Sayre; first came under my notice, September 1, 1866, when I took charge of this service. The history which I then obtained was as follows :

When ten years old, Schmidt was attacked with inflammation of the right knee. Four years later he had another attack, which confined him to his bed twelve months Six years later an opening occurred just above the knee joint, over the back of the femur, from which matter was discharged. This has remained open ever since. In the meantime the leg was drawn back to a right angle with the thigh, the head of the tibia being apparently dislocated backwards. The leg ceased

to grow in length, but not the femur. From the ankle upwards, over a space of about six inches, the soft parts were much enlarged, presenting an appearance resembling elephantiasis. The knee was completely anchylosed. He was suffering also from pain extending the whole length of the limb, from the trochanter major downwards.

July 31, 1866. The leg was amputated two or three inches below the joint by Dr. Sayre, in presence of Dr. Wood, I think, and several other gentlemen. On examination of the limb the enlarged condition of the soft parts was found to be due in part to a real hypertrophy of the integuments, but mainly to an abundant serous infiltration of the areolar tissue. The bone was not necrosed or carious, but it was soft, and the medulla was dark. These are all the facts in relation to the condition of the limb which I have been able to gather. The condition of hypertrophy was thought to be due to the pressure of the head of the femur against the popliteal vessels.

The amputation was not made above the open sinus, in the lower and back part of the femur, for the reason that this opening was believed to lead to a sequestrum, which might be subsequently removed, and thus a longer stump would be secured to the patient.

The wound made by the amputation was nearly healed when the patient came under my notice. The posterior sinus was still open. The pain along the whole length of the femur had greatly increased, and the stump was enlarged and was continuing to enlarge, presenting an appearance of actual hypertrophy. His appetite was very good. He had had no chills.

After a careful examination I decided that it was an example of ostitis, periostitis and osteo-myelitis; in short, that the entire bone with its investments was diseased, and that nothing short of amputation at the hip joint could arrest its progress. Accordingly, I called a consultation of the hospital surgeons. Some of the gentlemen dissented from my views, regarding it as a case of central necrosis—that is, as a case of sequestrum inclosed in an involucrum. A long incision made upon the outside of the femur down to the trochanter major and the shaft, revealed a large collection of pus, and a surface of rough bone. This did not change the opinion of my colleagues. It was decided to make an *exploratory* amputation. I mean to say that an amputation was to be made just above the open ulcer in the lower part of the limb, and if a sequestrum was found it was to be removed and the remainder of the thigh left to the patient; but if the whole bone was found to be diseased, the thigh was to be immediately amputated at the hip joint.

September 15, 1866, I made the exploratory amputation, in the pres-

ence of the medical class, assisted by Dr. Stephen Smith and the house surgeons—patient under the influence of ether. On making a section of the soft parts, by the circular incision at the upper end of the lower third of the thigh, the muscular tissue was found to have almost entirely disappeared. The saw was applied and the bone divided, when it became evident that the entire shaft of the femur was diseased. No sequestrum existed in any portion of the femur, as we subsequently ascertained, except a small scale of the size of the thumb-nail on the outer surface of the bone, opposite the sinus in the lower and back part of the thigh.

Without delay I proceeded to amputate at the hip joint—the operation being made by carrying one long incision from the trochanter down to the end of the stump, and then separating the bone from the soft parts and from the socket. Very little blood was lost in the operation. The patient was placed in bed with the wound well open, to admit of the free escape of blood and of serum or pus. He soon recovered from the effect of the anæsthetic, and his case progressed favorably until the fifth day. His appetite was good and his strength remarkable until this period. On the fifth day he had a slight chill, announcing the occurrence of pyæmia. The chill returned on the following day with increased severity, and on the seventh day he died. There was no autopsy.

The specimen which I present to you represents the entire femur, divided below its middle by the saw, about three inches of the upper end of the tibia remaining attached to the lower moiety, being united by a complete bony anchylosis. The lower half of the femur is considerably expanded and its walls thickened. In its lower third the medullary canal is obliterated and the whole structure of the bone is greatly condensed, except here and there at points, where large cavities exist, containing pus, marrow and blood corpuscles. In this portion of the bone the inflammatory process has nearly ceased, and its results are alone observed. In the upper half, however, the disease is in active progress. The lower portion of the medullary canal contains pus, the upper portion pus with blood. The cancellous tissue of the head and neck is broken down at certain points, the cavities containing pus, while the intense congestion of the medullary vessels gives to the whole interior surface—where the saw has divided longitudinally the head and neck—a bright vermillion color, shaded with the yellow imparted by the marrow cells. The whole exterior of the bone is rough and occasionally bathed in pus; at other points bony spiculæ are extending outwards into the soft parts.

It is evident that this malady began in the tibia, and that it has gradually extended upward through the knee joint to the femur.

CARIES OF HEAD OF HUMERUS—NOT TRAUMATIC—SCROFULOUS DIATHESIS—SPONTANEOUS ARREST—REPRODUCTION OF CARIES IN CONSEQUENCE OF PROTRACTED NURSING—RESECTION OF UPPER END OF HUMERUS. BY DR. F. H. HAMILTON.

Mrs. ——, æt. 28, of delicate constitution. When twelve years old, she first experienced a pain in the right shoulder. It was not the result of an injury. This has been occasionally painful from that time until the present. A few years since an abscess formed in the side of her neck, but this was not connected with the shoulder. She is married, and has borne and nursed four children. When she had been nursing her third child twelve months, her shoulder became much more painful and tender; when she had nursed it fourteen months she consulted me. By my advice she immediately weaned the child, and soon her arm began to improve, and in a few months it had almost ceased to trouble her.

In October, 1865, she sprained her shoulder badly in attempting to save herself from falling, and in January following I opened an abscess communicating with the joint. She was then nursing her fourth child. The child was weaned, but the disease in the joint continued to progress.

On the 6th of July, 1866, I removed the head of the humerus. It is proper to notice, before describing the operation and its results, that although this patient, suffering under ulceration of the joint, was examined by me many times during the last two years; there was at no time much swelling of the joint, and pressing the head of the bone into the socket never caused pain, not even during the last days preceding the operation. The joint was tender on pressure from without and in front, and pain extended down the arm in the direction of the nerves. There was also considerable muscular anchylosis. The joint surfaces, that is to say, the open and eroded surfaces of bone in the joint and the shaft of the bone, were not painful, or even tender. This total absence of pain and sensibility in certain cases of diseased and ulcerated bones I have noticed before, and since these phenomena are not usually absent, and especially for the reason that surgical writers do not, so far as I am aware, intimate that they are ever absent where such lesions of bone exist, I have thought it important to call especial attention to the fact. Recently Dr. Alexander Mott had occasion to amputate a leg at the Charity Hospital. Dr. Sayre, Dr. Mason, myself,

and several others were present at the consultation. The disease was in or about the knee joint. There was extensive suppuration, but the probe did not pass into the joint, and, inasmuch as pressing the leg forcibly up occasioned no pain in the joint, some of the gentlemen concluded that the joint was not diseased. I remarked then that I did not consider that circumstance as by any means conclusive. I still believed, from other signs, that the joint was diseased. The amputation being made, the joint surfaces were found almost completely destroyed by ulceration.

In short, while it is in general true that inflamed bone, and especially ulcerated surfaces of bone communicating with joints, give rise to much pain and are very sensitive to the touch, it is certainly true that it is occasionally otherwise.

The operation was made by a single long incision, parallel to and between the posterior fibres of the deltoid muscle, uniting with a right-angled incision which only followed the track of the sinus. The bone was divided through the surgical neck with the chain-saw and then removed from the tissues surrounding the head by dissection. One small vessel required a ligature.

The dressing consisted in closing the upper part of the wound with adhesive plaster, and in suspending the arm in a sling. Measures were taken to keep the lower part of the wound open. No splints were employed, and never ought to be in similar cases. On the 5th day the patient had a chill, followed by great prostration and profuse perspiration. I apprehended pyæmia, but the chill never recurred. On the sixth day she sat up and on the ninth day she walked down stairs. The wound closed completely about the 26th of August, and on the 26th of September, when I examined it for the last time, the arm was well. When it is allowed to hang by the side it is half an inch shorter than the opposite. When she attempts to use the arm it shortens up so that the upper end of the humerus touches the glenoid cavity. She can raise the elbow from the body about four inches. In every respect the arm is much more useful than it has been the past two years.

Examination of the Specimen.—There are presented two surfaces upon the upper or articular extremity of the specimen, in which the disease is presented in two stages. One a stage of repair or of arrest, and the other a stage of progress.

One of these is formed of two cup-like depressions, situated in front and directly behind the lesser tuberosity. This surface, which now, after being thoroughly cleansed, presents open cancelli, was, when first removed, covered over with a firm, smooth membrane, and indicated a

point where the disease had existed probably a year before, or perhaps at a much earlier period, and had been arrested.

Another large and more irregular surface is situated posteriorly, behind the greater tuberosity, and at this point the cancelli were found to be open, not being covered in by any new membrane; the bony tissue was soft, and some loose fragments were found lying here, surrounded with a grayish matter. Here the disease was in progress. It must be remarked, however, that coincident with the process of destruction, there was here also a process of repair, but it was unlike the process of repair seen in the first named surface. In the first the disease was only arrested. At this point the repair had gone one step further. Springing from the interior of the lamellated tissue were pretty firm fibrous bands, which probably had been united to the glenoid cavity, and which, in case the disease had been arrested, would eventually have formed for the shoulders a false joint.

Resumé of points of Special Interest.—1st. The disease had its source in a frail constitution.

2d. It was especially aggravated by the exhaustion consequent upon nursing.

3d. It was once arrested spontaneously after having made considerable progress; probably the arrest was accomplished simply by weaning the child.

4th. Motion or friction of the joint surfaces did not occasion pain.

5th. Much of the final result has depended upon getting the patient as soon as possible out of bed and out of doors.

EPITHELIOMA OF SHOULDER. DR. J. B. REYNOLDS.

Dr. Reynolds presented a specimen of cancerous tumor of the shoulder, which had been sent him for microscopical examination by Dr. Lewis, of Clairmont, Iowa. There was nothing of special interest in the history of the case.

OVARIAN TUMOR OF A CANCEROUS NATURE.

Dr. Reynolds also exhibited a second specimen, which had been removed by Dr. T. G. Thomas, and gave the following account of the case. The patient was a young woman twenty-one years of age, who, up to seven months ago, was in perfect health. At that time she noticed a little uneasiness and swelling in the lower and left part of the abdomen. She presented herself a little over a month ago to Dr. Thomas, who suspected ovarian disease. Professor Budd and Dr. Swift, who also examined her at that time, concurred in that opinion. The exact

size of the tumor could not be ascertained. She was told to return at the end of a month and report progress. When she again presented herself, at the expiration of this period, she was discovered to have lost flesh, while the tumor apparently had increased. On examination, the doctor (Thomas) found the abdomen filled with fluid, and on pressing suddenly through the fluid he was able to strike upon a mass, irregularly shaped, beneath it. The patient being very anxious for the removal of the tumor, ether was administered, and Dr. Thomas, in the presence of Drs. Hull, Otis, and myself, cut down very cautiously through the abdominal walls. Opening into the peritoneal sac, about one gallon of serous fluid was let out. Then we came down upon the tumor. It was quite hard; here and there it was semi-transparent and filled with a thick, honey-like fluid, and when the mass was turned out of the abdominal cavity the more solid portions were covered with warty excrescences. The peritoneum was covered on its surface by thin layers of lymph. There were no attachments to the bladder or the uterus. The glands within the abdomen seemed to be healthy. The tumor, after removal, was examined microscopically by Drs. Otis, Draper and myself, and found to be epithelial cancer.

Dr. Post remarked that the specimen was an unusual one occurring in a patient of that early age. He had only met with one case of this variety of cancer in a girl, and she was only twenty years of age.

Stated Meeting, October 10, 1866.

Dr. W. B. Bibbins, Chairman *pro tem.*

MORBUS COXARIUS—RESECTION OF HEAD OF FEMUR.

Dr. Post exhibited the upper extremity of the femur of a boy eight years of age, which was removed that morning by the operation of exsection. The history of the case was this: About five years ago, when the boy was three years old, he had a fall upon his left hip, after which morbus coxarius was developed. Not long since suppuration occurred, and there were numerous sinuses about the upper part of the thigh, some of them opening into the groin and others at different points along the upper third of the thigh. A probe introduced into these openings struck dead bone at the bottom of each. I saw the child for the first time a few weeks since. I was called to him partly on account of the existence of an abscess, about as large as my fist, situated on the outer side of the thigh, a little less than half way down from the upper part. I waited several weeks before this incision had healed, and the abscess contracted sufficiently to allow of an operation. The patient had, in

the meantime, been placed upon tonics, under which his general health had improved. He complained frequently of pain; referred to the knee, as is usual in morbus coxarius. I would observe that the opposite side to that on which I opened the abscess has the same disease, apparently in its second stage, the limb being rigid and apparently elongated. I found the rigidity continued while the patient was under ether; it was extremely sensitive when any motion of the joint was attempted. The morbid specimen which is presented is especially interesting on account of the form of the disease which is here shown; not caries, as is usual, but *necrosis*. There are two distinct sequestra, one on the outer side of the trochanter and one on the inner side, corresponding to the part where the head had been absorbed.

Dr. Bauer has presented a somewhat similar case to the Society, where a sequestrum was found imbedded in the head of the bone. This was the only other case of the sort that he had heard of.

My impression was, from the shallow and roughened appearance of the acetabulum, that a small portion of the head remained attached to it. The patient is now doing well, and the chances are that the cavity will granulate.

DIVISION OF THE DORSAL BRANCH OF THE MUSCULO-SPIRAL NERVE FOR SEVERE AND PROLONGED NEURALGIA—TEMPORARY RELIEF—SUBSEQUENT REMOVAL OF PORTION OF THE NERVE. DR. A. C. POST.

Dr. Post then presented another specimen, removed that day, and gave the following history of it. The case was an exceedingly interesting one. The patient was a physician in the State of Georgia. While in New York, attending lectures at the University, in the winter of 1860 and 1861, he fell upon the ice and injured his wrist. He was not aware at the time, however, that he had sustained a fracture. A few days after the injury he began to suffer severe pain upon the posterior part of the forearm, a little above the articulation of the wrist. This pain increased in severity until, in the course of a few months, it became extremely severe, and it has continued so until the present time, a period of more than five years. The pain was paroxysmal, commencing in the evening and continuing with great intensity throughout the night, except in so far as it was relieved by anodynes. In order to obtain relief it became necessary for him to take enormous doses of morphine. His ordinary dose was half a drachm of the sulphate at a single dose, which is equivalent to 120 grains of opium.

Within the last year, the patient called on Professor Dugas, at Augusta, Georgia, who, having made an exploratory incision

on the posterior aspect of the forearm, discovered that there had been a fracture of the radius, from which there had appeared an extra growth of bone in the interosseous space towards the ulnar, and that a nerve passing over this part had become, as he supposed, irritated. He divided this nerve, as I was informed, and as the result the pain was relieved for a time. As the distress had returned when the incision healed, Prof. D. recommended that the forearm should be amputated. The sufferer sought my opinion concerning his case, and asked if I would take charge of him if he came on to the city. I of course answered in the affirmative. I found, on examining the forearm, marks of the scar made by the incision, a slight enlargement of the lower part of the forearm, and a slight tenderness on pressure, with very little redness. I determined to exsect a portion of this nerve. I attempted to place him under ether, but as he had been accustomed to such enormous doses of morphine, and also of chloroform, I found it very difficult to get him under the influence of the anæsthetic. The ether was less efficient than it otherwise would have been, as I was compelled, on account of the want of proper light in his room, to operate in the open air on an adjoining piazza. After trying the ether for some time, we substituted chloroform, and he came more readily under its influence, although we had to keep up its administration pretty constantly to maintain him asleep. I cut into the old scar and exposed the posterior surface of the radius. I found that the dorsal branch of the musculo-spiral nerve was very much enlarged—to four or five times its normal size. It was very vascular, so that in attempting to detach it from its connections there was considerable hemorrhage. The bleeding, although difficult to restrain, was merely enough to embarrass the operation, but not to injure the patient. I exposed, as fully as I could, the portion of nerve which I found to be enlarged, and removed all of it which was accessible from the bottom of the incision. About an inch in length was thus taken away. I afterwards brought the wound together by suture, and the future result of the case has to be determined by time. At the upper part of the incision I found that the nerve at the point of section was still somewhat enlarged, but I could not readily get access to the parts beyond. It has occurred to me that if the operation shall prove unsuccessful, that it would be desirable to excise a portion of the trunk of the musculo-spiral nerve, or a portion of the branch higher up.

On further examination, I found that Prof. Dugas' account of the condition of the radius was correct, that there evidently had been

fracture, and that a new growth of bone had encroached upon the interosseous space. There were, however, no evidences of direct irritation to the inflamed nerve, due to the presence of this growth.

Dr. Post, in this connection, referred to the case of neuralgia of the stump operated upon by him in Colorado last season. This operation, it will be recollected, consisted in shortening of the stump and a section of the offending nerves high up. The case, contrary to the predictions of such gentlemen who heard the case related to the Society, has done well, there being no return of pain a year after the exsection.

Dr. Bibbins remarked that a few years since a woman was admitted to Bellevue Hospital for neuralgia, and underwent the operation of exsection of the superior maxillary nerve for its cure. The case was published soon after as one of recovery. The cure, however, was not a complete one, as she subsequently came under his care for treatment of the same affection in a very aggravated form.

(To be continued.)

NEW YORK ACADEMY OF MEDICINE.

ABSTRACT OF PROF. J. C. DALTON'S PAPER ON VIVISECTION.

Dr. J. C. Dalton read an address on the subject of Vivisection, as practiced in connection with physiological experiments and as a means of discovery in the various departments of medicine and surgery. Both the propriety and the usefulness of vivisection have been called in question of late, in various quarters, and the address of Dr. Dalton was intended as an examination of the whole matter, with a view to free the subject from misconceptions and to show what is its true value as an adjuvant in medical progress. The term vivisection was retained, as being a concise and convenient appellation, although not exactly a correct one. Etymologically, the term vivisection implies the employment of cutting operations upon living animals. But in reality cutting operations do not always form a part of modern physiological experiments, since it frequently happens that the nature of the experiment does not demand or admit of them—the animals being subjected, instead, to the respiration of particular gases, the action of drugs or medicines, of peculiar kinds of food, or of ligatures, galvanism, compression or caustics. The subject of discussion, therefore, was not vivisection in its narrowest sense, but the whole subject of *experimentation on living animals*, no matter what the special means employed might be; for all the advantages derived from this method, as well as the objections made against it, depend on the fact, not that the experi-

ments are made with or without cutting operations, but simply that they are experiments performed upon living animals.

Having settled the nature of the subject under discussion, the address took up the objections which have been made against it, and considered them in succession. These objections are mainly three in number, viz.:

1st. That experiments upon living animals are cruel;

2d. That they are deceitful; and,

3d. That they are useless.

The first objection, viz., that of cruelty, which has been much insisted on, arises mostly from ignorance of the manner in which physiological experiments are actually conducted. It is easy for sensational writers, who are not themselves acquainted with the subject, to draw exaggerated and even false pictures of the sufferings of animals under the physiological experiment. But for any one at all familiar with the practice, it is evident that pain, so far from being a desirable or necessary element in such experiments, would be, in ninety-nine cases out of a hundred, a difficulty in the way of the experimenter, and, even apart from motives of humanity, it would be for his interest to avoid it. Accordingly, it is only a very small proportion of physiological experiments, in point of fact, into which pain enters at all as a necessary or allowable element. Cutting operations in particular are rendered painless, in nearly every case, by etherization of the animal; and this etherization is useful, both by relieving the animal from suffering, by removing one disturbing element in the experiment, and by enabling the experimenter to perform the necessary operation more easily and conveniently. In the single class of cases where etherization cannot be used, viz., where the sensibility of particular nerves or nervous centres is the object of investigation, the amount of pain is practically reduced to very narrow limits, owing to two causes: first, because in a large proportion of these cases the nervous tract experimented on is found upon examination to be insensible instead of sensitive; and, secondly, that when it is sensitive, this fact does not require any torture of the animal, nor the infliction of any excessive pain, to establish its existence, but only so much impression as will produce the evidences of sensibility.

The greater part of the address was occupied with a detailed history of the various important discoveries in physiology and other departments of medicine, showing that, in point of fact, experimentation on iving animals has not proved deceitful nor useless, but that, on the contrary, all our most valuable knowledge in physiology, and much of

that in practical medicine, surgery and hygiene has been derived from this source. It is a great mistake to suppose that this method of experimenting is a new thing. It is more than seventeen hundred years old, for Galen, who gave the first decided impulse to medicine as a practical science, was also the first who was accustomed to experiment intelligently on living animals; and since his time, the periods at which medicine has more particularly advanced have been exactly those periods at which this kind of investigation has been most assiduously employed. The greatest physiological discovery of all, viz., that of the circulation of the blood, was accomplished, as we all know, by Harvey, directly through the means of experimenting upon animals; and all the details of the movements and function of the heart, the action of the arteries and the returning current in the veins, were successively ascertained by him by continued personal inspection of these parts, while life was going on.

All our knowledge of the nature and mechanism of respiration was obtained in the same way: by the experiments of Sir Robert Boyle with the air-pump on kittens, birds, frogs, fish, snakes and insects; those of Bernouilli upon fish in water deprived of atmospheric air; of Mayow and Priestley on air vitiated by continued respiration; and especially by those of Lavoisier on the composition of the atmosphere and the changes which it undergoes by the respiration of animals. Many other details in regard to the respiratory process have since been discovered by continued employment of the same means; but the main facts were established at that time, and our real knowledge of the function of respiration dates from Lavoisier, as that of the circulation dates from Harvey.

Among the more practical results of experiments on animals alluded to in the address was the operation of *Transfusion of the Blood.* The history of this operation is somewhat peculiar. The earliest form in which the idea of transfusion presented itself was that of injecting into the blood vessels certain medicinal agents. This was first done in England about the middle of the seventeenth century, under the auspices of Sir Robert Boyle, at which time the feasibility of this operation was established, and it was shown that a solution of opium might be injected into the blood vessels of a dog, and thus produce a narcotic effect upon the brain without killing the animal. These researches were followed by the experiments of Richard Lower, on the transfusion of blood from the vessels of one animal into those of another. His first experiments were done in 1665, and were reported by Mr. Boyle to the Royal Society in the following year. The

experiments consisted in placing a ligature upon a dog's carotid artery, opening the vessel below the ligature, and inserting into it a quill of proper size to serve as a canula; this canula was then connected with the jugular vein of another dog, so placed as to receive the blood coming from the carotid artery of the first in a direction to pass downward to the heart, and so mingle with the mass of the circulating current. The jugular vein of this dog was then opened above the insertion of the canula, and he was allowed to bleed from it; the blood lost in this way by the second dog being replaced by that which was transfused from the vessels of the first.

These experiments were quite successful, and first showed that death from hemorrhage might be prevented by transfusion.

These results soon led to the idea of performing the same operation on the human subject. This was first done in France by a physician and a surgeon named Denis and Emmerets. They were led to believe that the operation might result in the cure of diseases, by introducing healthy blood from a foreign source into the veins of the patient; and some apparently successful results of this kind excited among the profession great enthusiasm in its favor. But these expectations soon proved unfounded, and several cases of failure afterward produced so much reaction against it that in 1668 the Parliament of Paris passed a law forbidding the operation to be performed except by consent of the Faculty.

The matter remained in this condition until 1818, when Dr. James Blundell, of London, brought back the operation to its original object, applying it, not to the cure of diseases, but to the preservation of life after exhausting hemorrhage. He also discovered and exposed the principal error in the previous mode of doing the operation, viz., the use of blood of animals of a different kind, instead of those belonging to the same species.

He performed thirty-three experiments on animals, and showed by them—

1st. That dogs, exhausted by hemorrhage, may be resuscitated even after stoppage of the respiration, by injecting the blood of other dogs.

2d. That human blood injected into a dog in large quantity, sufficient to replace an exhausting hemorrhage, though it produces a temporary reanimation, does not save life, but the animal dies some hours afterward.

3d. That transfusion of blood in animals of the same species will be successful, whether the blood used be arterial or venous.

4th. That blood may be received into a cup and passed through a syringe without being thereby rendered unfit for the purposes of life.

The transfusion of blood thus placed upon its proper footing, and still further improved by the investigations of Prevost and Dumas, Milne-Edwards, Dieffenbach and Bischoff, was adopted by the profession, and is now known as an established and useful operation, applicable to cases in which an exhausting hemorrhage in a healthy person has brought the patient to the point of death. In these cases it has been long known, as mentioned by Blundell, that there is an interval, often of several hours, during which the patient is evidently sinking, and when other means of restoration are of no avail. Bérard has recorded fourteen such cases, in which the operation saved the life of the patient. Two successful cases are also recorded in the *British and Foreign Medico-Chirurgical Review* for July, 1857; one by the late Professor Brainard, of Chicago, in the *Chicago Medical Journal* for February, 1860, and one in this Journal for November of the present year.

The history of various other investigations and discoveries was given in a similar manner, viz., that of artificial respiration, by Robert Hook; of the principal functions of the nervous system, by Charles Bell, Magendie, Flourens, Legallois, Bernard and Brown-Séquard; of the operation for aneurism, by John Hunter; of the office of the periosteum in the restoration of bone, by Du Hamel, Syme, Wagner and Ollier; of the nature and treatment of serpent bites, by S. Weir Mitchell; and of the pathology and origin of tapeworm and trichinous disease, by Siebold, Leuckart, Küchenmeister and others. All these results, as well as a multitude of other details, by which our knowledge of physiology has been enlarged, and by which many facts of the most practical bearing have been introduced into medicine and surgery, show the real usefulness of experimentation upon living animals. The truth is that many of the discoveries which have been made in this way are so important and fundamental, have become so incorporated with the general mass of medical knowledge, and are now so completely a part of our scientific patrimony, that we are apt to overlook the source from which they have been derived, and to forget the real magnitude of the debt which practical medicine owes to experimental physiology.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

An Introduction to Practical Chemistry. By JOHN E. BOWMAN, F.C.S., late Professor of Practical Chemistry in King's College, London. Edited by CHARLES L. BLOXAM, F.C.S., Professor of Practical Chemistry in King's College, etc. Fourth American, from the fifth revised London edition. Philadelphia: Henry C. Lea. 1866. 12mo, pp. 351.

The works of the late Professor Bowman, on chemistry, have long and deservedly held a prominent place in our scientific literature, and if there be any one reason for this more marked than another, we should say it is because of their combined conciseness with correctness. Not a superfluous word is employed, and much space is thus saved that in many authors is wasted in vague generalities and confusing theoretical discussions that bewilder rather than enlighten the student. This edition, which is prepared by Professor Bowman's successor at King's College, is quite up to the advances that are constantly making in this progressive science. We miss those familiar formulæ which in our student days were so often stumbling blocks and snares in the path of the less apt of the searchers after knowledge, though in reality but the keys which opened that knowledge to our understanding. The omission is intentional, for the question naturally arose whether the unitary system of symbols, which is rapidly coming into use among chemists, should be adopted. In this system, the symbol for hydrogen (H) is made to represent the unit of combining volume as well as of combining weight, and the atomic weight of oxygen is = 16. The adoption of this system would have necessitated such changes in the mode of arranging the formulæ, as well as alteration in the value of the symbols, as would have rendered them unintelligible to those accustomed to the older nomenclature; and on the other hand it was deemed "unwise to present those educated in the unitary system formulæ which they have been taught to regard as obsolete." The student, therefore, is instructed to work out the equations for himself, and if teachers will only insist upon his so doing, the result will be decidedly to his advantage—for he will not only understand more clearly, but will remember more accurately the processes which these equations represent. On the whole, then, we think the decision of the editor a judicious one, and calculated to increase the practical value of the book. Several other important changes and additions are made in this edition which facilitate the student's labor, especially in acquiring a thorough acquaintance with the various processes employed in analysis, which, we may

add, was the leading idea kept in view by the author in the original preparation of the volume. In the rapid strides which science is making, no text-book can long remain an undisputed authority; but at present we can commend this work as quite up to the existing state of our chemical knowledge, and as a reliable guide for the student.

Surgical Clinic of La Charité: "Lessons" upon the Diagnosis and Treatment of Surgical Diseases. Delivered in the month of August, 1865, by Professor Velpeau, Member de l'Institute et de l'Académie Impériale de Médicine. Collected and edited by A. Regnard, Interne des Hôpitaux, reviewed by the Professor. Translated by W. C. B. Fifield, M.D. Boston: J. Campbell. 1866. 12mo, pp. 103.

This little volume of lectures forms a summary of the cases observed in the service of Professor Velpeau during the current year. It is very valuable to practitioners on account of the hints the Professor gives regarding the pathology and treatment of numerous surgical affections, and of the statistics of surgical operations. The subjects treated are: Fractures, Affections of the Joints, Inflammations and Abscesses, Affections of the Lymphatic System, Burns and Contusions, Affections of the Genito-Urinary Organs, Affections of the Anal Region, Affections of the Eyes, and statistics of operations.

The translation, however, is very ordinary. *Leçons* is translated into lessons instead of lectures. There are also two mistakes in the transcription of the Professor's titles, viz., l'Institute instead of l'Institut, Médicine instead of Médecine. So much for the title-page; the text is in keeping, and nothing need here be said in its regard. The translation should not, however, detract from the merit which the book possesses.

A Treatise on the Principles and Practice of Medicine, designed for the use of Practitioners and Students of Medicine. By Austin Flint, M.D., Professor of the Principles and Practice of Medicine in Bellevue Hospital Medical College, etc., etc. Second edition, revised and enlarged. Philadelphia: Henry C. Lea. 1867. 8vo, pp. 967.

The mere fact that within four months from the first publication of Prof. Flint's treatise a second edition was called for, is an indorsement of the character of the work that justifies the high estimate which was put upon it by his numerous reviewers, and that must be especially gratifying to the author. Our review of the original edition appeared so recently that we deem it unnecessary now to do more than very briefly notice the present edition. Although but a very limited time was allowed the author for a revision, several important changes and

additions have been made which, it is believed, will enhance the practical utility of the volume. The portion treating of Pyæmia has been rewritten; three affections not noticed in the first edition are described, viz.: Pertussis, General Cerebral Paralysis, and Polyuria. Epidemic Cholera has been considered at greater length, and in connection with many affections there has been added new matter, much of which relates to special therapeutics. We notice an improvement in the mechanical execution of the volume that is gratifying, though there is still room for greater advance in this respect. We consider the book, in all its essentials, as the best adapted for the student of any of our numerous text-books on this subject.

An Index of Diseases and their Treatment. By THOMAS HAWKES TANNER, M.D., F.L.S., etc., etc. Philadelphia: Lindsay & Blakiston. 1867. 8vo, pp. 397.

Dr. Tanner's "Index" is intended to facilitate the daily work of the busy practitioner, by placing in his hands a guide to the treatment of special diseases, when the remedies that may have been employed have proved unsuccessful. This implies on the part of the practitioner that his diagnosis has been made, and correctly, too; but to afford further assistance and render the book still more serviceable, concise and well defined descriptions of the diseases are given, and in many instances the differential diagnosis from those maladies for which such diseases might be mistaken is added. Considered as such, we esteem the book of great value, for we do not know where in an equal compass so much information can be found.

In the sections devoted to treatment, every agent or remedy is noted that has been approved by experience, and most of those also are given which have been recommended by the different authorities, thus rendering this portion of the work unusually valuable. The appendix contains formulæ reprinted from the author's work on the *Practice of Medicine*, and references to them are incorporated in the text. Under the heading of Climates for Invalids will be found a very elaborate description of the different countries and places that have been recommended for their real or supposed virtues in the cure of special diseases. The principal mineral waters and the places where they are found naturally are also described, and the affections for which they have been found useful are noted. Altogether the author's task has been most happily accomplished, and the volume is an exceedingly valuable and instructive one, and cannot fail to do good in the hands of those for whom it is prepared, and to whom we heartily commend it.

To the student, however, who is as yet unskilled in diagnosis and

not fully acquainted with the nature of disease and the principles of treatment, this volume will not only not prove beneficial, but be positively injurious, as, in our estimation, are all the hand-books and *vade mecums* prepared expressly for students, and which generally serve only to facilitate the process of "cramming" for examinations, and to encourage irregular and undisciplined habits of study and a reliance upon the most superficial and easily acquired knowledge. The author expressly disclaims in his preface the intention of furnishing aid to the student, and directs him to look elsewhere for that guidance and assistance he needs in mastering his professional studies; and we cannot but fear that his book, which in proper hands and for legitimate purposes must be of great service, may, by reason of its admirable adaptability for this end, be put to improper use by those for whom it is not intended, and thus in a measure defeat the very purpose which is aimed at in its preparation—a result that we are sure no one would regret more sincerely than the author himself.

A Practical Treatise on Diseases of the Skin. By J. Moore Neligan, M.D., M.R.I.A., etc. Fifth American, from the second revised and enlarged Dublin edition, by T. W. Belcher, M.D., Dub., B.M., M.A., Oxon., etc. Philadelphia: Henry C. Lea. 1866. 12mo, pp. 462.

This book is an exact reprint of the American edition of 1854, with additions by Dr. Belcher, successor and former pupil of the late distinguished author. Since the first publication of this volume, no department of medicine has been the field of more fruitful research than Dermatology, and the editor has incorporated herein the results of the observations of Hebra, Bazin, Devergie, Hardy, Fox, McCall, Anderson and others, bringing the subject down to the present limit of knowledge. The editor has been scrupulously careful to leave intact the plan and phraseology of the original edition, and his own most valuable additions have been incorporated in so unobtrusive a manner as scarcely to attract the attention which they deserve; indeed it is questionable whether the work might not have been more valuable if it had been entirely remodeled, as a certain obscurity of style necessarily results from the manner in which the emendations are added, and in the departments of classification and parasitic diseases such improvements have been made as almost to demand a complete reconsideration of those important subjects. But as the additions to the volume embody a most thorough digest of the literature of the subject, they will greatly enhance the value of this already popular book. One of the most important of these additions is a bibliographical index, containing full references to all monographs and important articles in recent journal on diseases of the skin.

REPORTS ON THE PROGRESS OF MEDICINE.

ANATOMY AND PHYSIOLOGY.

1. *Report of a Case of Single Kidney.* (British Medical Journal, August 11.) Read before the British Medical Association. By JOHN C. MURRAY, M.D., Newcastle-on-Tyne.

A *lusus naturæ* is always regarded with interest; but when Nature, in one of her humorous moods, dispenses with an organ of vital importance in the animal economy, it demands the attention and interest of the naturalist and physiologist, and becomes worthy of being chronicled by the medical historian. It is, therefore, a duty incumbent upon the anatomist, who is the discoverer of any remarkable freak of Nature, to make what she has revealed to him a public possession. In accordance with this principle, I have the honor to submit to your notice and inspection a case of *single* kidney, which recently occurred in my practice, in order that it may be recorded through the medium of this branch of the British Medical Association. The case is as follows:

E. F., a strong, muscular man, of florid complexion, aged sixty-five years, five feet nine inches in height, born in the seventh month of utero-gestation, had always passed less urine, but of a deeper color, than normal. Nevertheless, he enjoyed good health until 1846 (his forty-sixth year); he then first suffered from nephralgic pain in his back, which lancinated down the course of the right ureter to the testicle and thigh of the same side, but ceased on his being cupped. From that time, after fatigue and exposure, he frequently felt pain in the right lumbar region, accompanied by dysuria, and sometimes hæmaturia; but never any similar pain in the left side. He was a free but regular liver; had been a blacksmith until 1858, when he received a government appointment, which had the effect of suddenly increasing his weight from 10½ to 13 stones, at which weight he remained, without variation, until his death.

On the 27th of May, 1866, he was seized with enteritic symptoms in the right iliac fossa, but continued his employment until the 30th, when he was obliged to relinquish duty and obtain professional aid. I was sent for, bled him, and administered appropriate remedies, after which he did very well until the 3d of June. An unfavorable change having occurred subsequent to my morning visit on that day, I was requested to see him again, which I did in the evening, in conjunction with Dr. White; but the patient was then so low that our efforts were fruitless to save him. He sank rapidly, and died on the morning of June 4th. At this untoward event I was much surprised, as he had been progressing so favorably. I now, however, attribute it to his solitary kidney becoming, from its close relationship to the inflamed colon, too congested for the continuance of its functions.

In compliance with my request, permission was granted to make an autopsy. Twenty-five hours after death, Mr. James Douglas Murray and I found post mortem appearances of enteritis, which had evidently commenced at the

caput cæcum coli, and extended along the ascending and part of the transverse colon. The rest of the bowel was in its natural state. The liver was not *fatty*, or otherwise diseased. Upon taking out the right kidney for inspection, we were astonished at its unusual size and weight; but, thinking it only enlarged from recent fatty degeneration, I made an incision from its convex border to the hilum, to see its internal structure, and also cut off a thin slice for subsequent examination. We then proceeded to inspect the left lumbar region, for the purpose of comparing the right kidney with its fellow. In this, however, we were disappointed. No trace of a left kidney, collapsed, atrophied, nor yet rudimentary, existed, nor was there any semblance to renal vessels. The kidneys being occasionally variable in their relations, and often mobile, we were mindful to examine very carefully the whole of the abdominal cavity, and even pelvis; but the left kidney was *non est.* Our attention was then directed to the right kidney with increased interest. It was in its natural site, immobile, and deeply imbedded in fat. It is, as you will observe, of normal form, exaggerated in all its parts; is somewhat firmer and less friable in texture than natural. It shows some fatty deposit in its cortical part, but not enough to materially impair its functions. This, I think, may be accounted for by hyperæmia, consequent upon its having double duty to perform. It was deeply injected where, in relation to the ascending colon, the congestion penetrated its entire diameter. Part of the surface was of its natural color; and its original division into three lobes is seen. The investing tunic peeled readily off. After the kidney had been carefully washed and pressed, its proportions and weight, allowing for the quarter of an ounce cut off, were:

Length, 6 inches.	Diameter, $2\frac{1}{2}$ inches.
Breadth, $3\frac{5}{8}$ inches.	Weight, $10\frac{1}{4}$ ounces.

In this interesting case we have a beautiful instance of that compensation which nature always endeavors and so frequently succeeds in establishing, when she has lost or omitted an organ essential to the continuance of life; and it is very important, in treating renal affections (not blood diseases), to remember that this congenital irregularity has occasional existence, as it might account for the grave nature of symptoms which would of necessity arise from disease of one kidney, if there were no second organ to carry on the secretion. This, I think, is the more to be insisted upon, as the occurrence of this phenomenon is not sufficiently noted in our text-books, although more than fifty cases are on record.

On referring to a lengthened review of M. Rayer's *Treatise on the Diseases of the Kidneys, and the Morbid States of the Urinary Secretions*, published in the *British and Foreign Medical Review* for 1843, I find the following paragraphs:

"Numerous are the cases of three kidneys in the human subject described by authors, nor are examples of the existence of four of these organs wanting. The only point of physiological interest connected with this superabundance of kidney is, that no evidence exists of its ever being attended with unnaturally great secretion of urine."

In the case before you, however, the urine was less in quantity than usual. Again:

"Numerous authentic cases are to be found of absence of one kidney. The

remaining organ has generally been found larger than natural, and sometimes double its natural weight. It is either found in its natural place, or a little higher or lower. When a single kidney has been described as seated crosswise on the spine, there no doubt existed two kidneys, fused, as it were, into one."

This is known as the horse-shoe kidney. Further:

"The total absence of kidneys has been several times noticed in the fœtus, occasionally in the infant at birth."

And, more wonderful still, a case is recorded by M. Moulon, of a girl who died in her fifteenth year, of chronic enteritis, who had no kidneys or urinary bladder. In this remarkable deprivation, M. Moulon thinks that the liver performed the office for the kidneys by vicarious secretion; for the umbilical vein was enlarged, and there was a constant flow of fluid from the umbilicus having the properties of urine.

2. *A Case of Movable Kidney.* (Lancet, July 21, 1866.)

The subject of the above curious peculiarity was a young woman, aged twenty-three, who was brought to the dispensary by her mother, in the month of February, 1866, for advice as to the nature of an abdominal tumor, which had for some years, it was said, existed on the right side, and about which the mother was considerably alarmed. On examination, there was detected a tumor, about the size of a human kidney, lying very superficially, and apparently only covered by the integuments and the abdominal muscles. The tumor was on the right side, on a level with the antero-superior spine of the ilium. It was extremely movable, and could be, as it were, entirely grasped by the hand. The tumor could be pushed from the position it usually occupied upwards and backwards, until it disappeared under the ribs of the left side, in the region of the spleen. After examining on several occasions the appearance and behavior of the tumor, Dr. Drysdale came to the conclusion that it was one of those rare cases of movable kidney which are sometimes met with. The patient was afterwards examined by several other physicians, who concurred in this diagnosis.

One remarkable concomitant feature in this case was that the patient was extremely rickety. The wrists were knotty, and both tibiæ twisted and misshapen. The chin was square, and the whole appearance of the young woman was that of rickets.

3. *Curara and Curarine.* (L'Union Médicale.)

Curara has been used against tetanus, by the mouth and subcutaneously. According to Cl. Bernard, who has tried at least ten different sorts of curara, obtained from the Indians of South America, and contained in calabashes, pots of clay, or still affixed to the extremity of the poisoned arrow, the poisonous power of this substance varies in a proportion of one to six; that still on the arrow being the most powerful, and that in the calabash the least.

Curara, as thus obtained, is a black, brittle, resinoid extract, said to be composed of many different vegetable and even some animal substances.

The question has been, whether the action of the poison is due to a single principle which is mixed with inert substances, or to the combined action of several distinct principles associated with each other in certain proportions, as in the case of opium.

In 1828 MM. Boussingault and Roulin discovered a substance which they considered an alkaloid, and named it *curarine,* although they could not obtain it crystalized. M. Preyer has succeeded in extracting the curarine crystalized.

There are two processes by which the same result is obtained. According to the first, the powdered curara is dissolved by absolute alcohol, and the alcohol distilled. Distilled water is poured upon the residue, and as the resin is not soluble in water it will remain upon the filter. The liquor which passes the filter is precipitated by an excess of bichloride of mercury which holds the curarine. The precipitate is then washed with distilled water and decomposed by a current of sulphuretted hydrogen. It is then filtered to separate the sulphuretted mercury, and the remainder is a solution of chlorohydrate of curarine. After repeating this process several times, one obtains an almost colorless solution from which chlorohydrate of curarine crystalizes.

By the second process, more complicated and difficult, colorless crystals of curarine are obtained. By the varying the second process, the chlorohydrate, nitrate, sulphate, and acetate of curarine are obtained.

Curarine contains no oxygen, and, besides araribine, discovered by Keith in the bark of the arariba rubra, is the only vegetable alkali which, without containing oxygen, is nevertheless crystalizable. It crystalizes in colorless quadrilaterals, has a persistent bitterness, is soluble in water or alcohol in any proportion, slightly soluble in chloroform and amylic alcohol, insoluble in anhydrous ether, benzole, spirits of turpentine, and gives the litmus paper a slight blue color.

Pure concentrated sulphuric acid poured upon curarine causes it to take a very persistent blue color, while with concentrated azotic acid there is produced a purple color. The bichromate of potassa gives, with curarine, as with strychnine, a violet color, but it is less persistent than when produced with strychnine. These different reactions being given, one may easily detect curarine in liquids from animals poisoned by it. The liquids may be evaporated, the residue treated by absolute alcohol, this product evaporated, and the last residue will give, with a drop of sulphuric acid, a beautiful blue color, indicating the presence of curarine.

According to the experiments of Cl. Bernard, *curarine* is more active than *curara.* That which is extracted from the curara of the calabashes was twenty times more active than the curara from which it was obtained.

The physiological effects of curarine differ from those of curara only by intensity, and this seems to demonstrate that curarine is the *active principle* of the curara.

4. *The Pacchionian Bodies.* (Medical Times & Gazette, July 7, 1866.)

The *Microscopical Journal* contains an elaborate paper on the "Pacchionian Bodies," by Dr. Bastian, who agrees with Rokitansky and Luschka as to

these bodies being invariably growths from the arachnoid, though he differs from the latter observer as to the fact of their ever springing from its parietal layer. They are in all cases not only continuous, but histologically identical, with the arachnoid membrane, without vessels or nerves, and covered over, in the earliest stages especially, by delicate, tesselated epithelium. Microscopically they are seen to be made up of fibrous tissue in different stages of development, intermixed with elastic fibres here and there. In old people these bodies contain deposits of "brain sand." They must be distinguished from other formations arising as the result of calcifications, of embolisms, and the like. Dr. Bastian discusses their nature; Luschka believes them to be normal structures, the rudiments of which can be detected at the earliest periods of life. It is, however, certain that at about twenty years of age they become common, and increase in frequency subsequently. It would seem, nevertheless, most probable that they are simple hypertrophic vegetations. "Two causes seem influential in bringing about a fibroid thickening and opacity of serous membranes—undue amount of friction on the one hand, which, as Dr. Jenner and other pathologists maintain, seems to be by far the most frequent cause of 'white patches' of the pericardium; and hyperæmia on the other, whether from chronic inflammation or oft-repeated congestions, to which this condition of arachnoid and synovial membranes seems most attributable." Repeated congestion is common after the middle periods of life, and the number of Pacchionian bodies seems to be in direct proportion to the frequency with which such congestions arise. Dr. Bastian does not think these bodies of much pathological import. "Still their growth is slow, and the pressure exerted upon the cerebrum can only be insignificant, seeing also that the direction is *outwards* towards more vascular parts, causing them to press upon the inner table of the skull, and finally produce more or less deep erosions in the vault of the cranium." They may also impede the current of blood through the veins, blocking up the sinuses, and increase more rapidly in consequence of the produced congestion. But no case of this kind has as yet been made out. The effects of their growth are so gradually produced that the local circulation has plenty of time to accommodate itself to any change.

5. *Fissure of the Sternum.* (Medical Press & Circular, May 9, 1866.)

At a meeting of the Medical Society of the College of Physicians, Dublin, Dr. Quinlan described a case of fissure of the sternum in a patient in St. Vincent's Hospital. This fissure was the result of caries of that bone, and, though much smaller, resembled the celebrated congenital case of M. Groux, exhibited in Dublin in the year 1857. The fissure was filled up with thin cicatrized skin, under which could be distinguished three separate undulations, movements which Dr. Quinlan referred to the right auricle, the right ventricle, and the commencement of the pulmonary artery. On applying the stethoscope, the ordinary sounds of the heart were heard much louder than usual, and at the end of the first sound a slight, peculiar metallic sound was occasionally audible. When the patient spoke continuously or coughed, the left lung protruded so as fill up the depression in the opening. Dr. Quinlan called attention to the great force of the action of the right auricle

and detailed a series of observations which he had made as to the exact difference of time between the ventricular systole and the pulse, on the dorsum of the foot, the wrist, and the neck.

6. *The Physiological Action of Narceine.* (Lancet, June 9, 1866.)

In a recent number of the *Journal de Chimie Médicale* there is an abstact of M. Linné's researches on the above subject, from which we perceive that the following conclusions have been arrived at: (1) Narceine is unquestionably of all the alkaloids of opium that which has the greatest narcotic power. *In the majority of cases* morphia and codeia do not produce as sound or as prolonged sleep as results from the use of narceine. (2) Narceine differs from the other alkaloids of opium in producing little perspiration, and in causing no loss of appetite or nausea. (3) So far from producing constipation of bowels, it causes relaxation, and, in large doses, actually gives rise to diarrhœa. (4) It not only produces sleep, but diminishes pain. (5) It has one peculiar action: it suppresses the flow of urine. For this reason M. Linné thinks it might be advantageously employed in cases of nocturnal incontinence of urine amongst children. But it seems to us that, until its action can be shown to be on the bladder rather than on the kidneys, its employment in such cases would be highly improper.

7. *Chloroform as a Reagent upon Bile in the Urine.* (L'Union Médicale, Sept. 16, 1865.)

To the already numerous tests of bile in the urine, M. Cunisset proposes to add chloroform. He puts into a tube 40 to 50 grammes of the urine to be tested, pours upon it 5 to 6 grammes of chloroform, and agitates the mixture. The bilious urine immediately take a beautiful yellow color, and after standing a while the chloroform falls to the bottom of the tube, carrying with it the fatty principles of the urine colored by the yellow matter of the bile.

Chloroform is said to be more sensitive than nitric acid.

Chloroform has also been spoken of as a test of albumen in the urine; but Becquerel (Gazette des Hôpitaux, Dec. 1, 1857) has shown in a distinct manner that chloroform for such a purpose is quite unreliable; for if chloroform be agitated with albuminous urine of a certain density, and normal urine of the same density, the same result will recur, only with a difference of time; the normal and the albuminous urines both forming an emulsion with the chloroform, and the emulsion remains longer suspended in the albuminous urine.

If gelatine and gum arabic are added to urine with chloroform, the result is the same as when albumen and chloroform are mixed in the urine.

8. *Action of Chloroform on the Blood.* (Virchow's Archiv., Jan., 1865, p. 126.)

Prof. A. Boettcher, of Dorpat, in 1862, noticed the power of chloroform to destroy the red globules of the blood, and to transpose hæmato-globulin into a crystalline form. He exposes the defibrinated blood to the vapors of chloroform in such a manner as to allow also the air to be in contact with the blood, and in a few minutes the blood is decolorized, and a crystal mass forms from it.

9. *The Brain of Green, the Malden Murderer.* (Boston Medical & Surgical Journal, June 14, 1866.)

The following is a correct report of the examination of Green's brain:

The substance of the brain was normal in appearance and firmness; slight extravasations were noticed on the cerebrum near the longitudinal fissure, near the left fissure of Sylvius and on the upper surface of the cerebellum.

Weight of the whole brain	2 lbs. 8 oz.
" " cerebrum	2 lbs. 3 oz.
" " cerebellum, with the medulla oblongata	5 oz.

Cerebrum : cerebellum :: 7 : 1.

In average cases they are as 8 : 1. Green's cerebellum, though absolutely small, was relatively large.

The specific gravity of the brain, the average of three determinations, was 1043.

In proportion to the size of the body, Green's brain was somewhat larger than the average. Taking the average weight of the brain at 3 lbs. and that of the body at 140 lbs., the weight of the first would be to that of the second as 1 : 46$\frac{2}{3}$. Green's body is stated to have weighed 100 lbs.; assuming this to be true, the weight of his brain was to that of his body as 1 : 40.

10. *Obliteration of the Aorta.* (British Medical Journal, Aug. 4, 1866.)

Dr. Schrötter presented to the Medical Society of Vienna a man, 23 years old, in whom there was an obliteration or contraction of the aorta on a level with the ductus arteriosus. The defect was congenital; and, as the symptoms were not as clear as usual, required careful diagnosis. The heart was deeply placed, and exhibited a commencing defect of the mitral valves. Scarcely any pulsation of the abdominal aorta was perceptible, and equally weak was that of the crural artery. No pulse was perceptible in the popliteal or pedal arteries. The dorsalis scapulæ, the superior and inferior intercostal, as well as the internal mammary by which the blood was conveyed into the descending aorta, were all largely developed, and pulsated and thrilled strongly. Towards the right outer border of the sternum there was dullness and a distinct thrill, produced either by the internal mammary or the distended aorta, probably by the latter, as the second sound at this point was louder than that of the pulmonary artery. The patient is well nourished and sound in all other respects.

11. *Influence of Chloroform on Respiration and Circulation.* (British Med. Jour., March 3, 1866.)

Dr. P. Q. Brondgeest sums up, in the following conclusions, a paper on the influence of chloroform on the action of the heart, on respiration, and on the pressure of the blood, in connection with section of the vagus nerve, and with poisoning by woorara. 1. The inhalation of chloroform exercises a remarkable influence on the frequency and strength of the heart's beat. The rhythm of the beat is at first slow, but afterwards is quickened; this quickening continues until death, and is accompanied by a diminution in the power of the heart's action. 2. These phenomena appear whether chloroform is

inhaled through the mouth or through an opening in the trachea, provided that it be given in sufficient quantity. Small quantities of chloroform administered during a long period do not exercise any undoubted influence on the action of the heart. 3. The pressure of the blood diminishes from the commencement of the inhalation of chloroform, until death. This diminution of pressure takes place during the retardation of the heart's beat, as well as during its acceleration. 4. After poisoning by woorara, retardation of the heart's action sets in, in some manner, and the heart's beat rapidly becomes very weak, so that death speedily follows, sometimes even during the retardation, sometimes when there is some acceleration. 5. After division of both pneumogastric nerves, the inhalation of chloroform is attended by a slow and regular diminution of the heart's action. A sudden and remarkable diminution does not occur. Death follows very speedily. 6. The respiratory movements, like the heart's action, are suddenly rendered slower; and then, almost simultaneously with the heart's action, are accelerated. They cease before the movements of the heart. 7. After division of the pneumogastric nerves the respiratory movements suddenly cease, often for half a minute, after which they return and are quickened. 8. Among the causes of death after the administration of chloroform, paralysis of the heart's action comes specially into notice. The chloroform exercises a paralyzing action either on the muscles or on the nerve centres of the heart, from which the rhythmic contractions proceed. Contractions cease sooner in the ventricles than in the auricles. 9. When the heart's movement has nearly ceased, the surest means of arousing it, and of obviating death, is to employ artificial respiration for a lengthened period. 10. When both pneumogastric nerves are divided during narcotism from chloroform, the heart's action is not remarkably quickened, but it continues until death of less power than before the section was made. (*Nederlansch Archief voor Genees-en Natuurk.*, 1865.)

12. *A System of Perivascular Canals in the Central Nervous Organs.* (Lancet, June 9, 1866.)

The last number of the *Archives des Sciences* contains a notice of Herr His's discovery of a peculiar series of channels which traverse the central nervous masses. He first detected them in a number of sections of the spinal cord, in which they were represented by grooves which he looked upon as opened channels. They are more distinct in the gray than in the white substance. Each groove incloses a blood vessel, which either lies freely within it or is attached to its walls. They are abundant enough in the brain, and this circumstance explains how one is enabled to remove whole vascular net works with the forceps from the surface of the cerebrum. Herr His's injections of these spaces show the perivascular canals to lie between the nervous substance and the pia-mater. He concludes that the spaces are connected with the lymphatic system, and thinks them analogous to those reservoirs which in the frog are placed between the integument and the muscles, and which almost completely separate one from the other.

13. *The Structure of the Crystalline Lens.* (Lancet, June 9, 1866.)

A very valuable paper has been published by Herr Von Becker in the *Archiv für Ophthalmologie* on the subject of the structure of the crystalline

lens. The eyes he investigated were those of the calf. They were prepared by maceration for a few hours in a solution of sulphuric acid (five drops to the ounce of distilled water). The capsule of the lens, he says, at first appears to be perfectly homogeneous, but when it is examined with a sufficiently high power, it exhibits striæ that indicate a lamellar structure, which is still more marked when the capsule has undergone morbid thickening. The anterior capsule is decidedly thicker than the other. In fish and in amphibia there is less difference between the two capsules in this respect than in mammalia and birds. The difference increases with age. In a man of seventy-two years it amounted to 0.047 millimetres. The inner surface of the thickened portion of the capsule is clothed with a layer of cells, which is not epithelial only, but is in some measure composed of small rounded cells. The fibres of the lens are thus developed: The small rounded cells of the capsule arrange themselves in groups of from two to six; their nuclei increase in size, assume a linear direction, and finally the cells themselves unite, and form cylinders of a concave and jointed appearance at the surface of the lens. The development goes on actively even at birth. Numerous spaces exist between the fibres, to which Herr Becker gives the name of *interfibrillary spaces*, and asks, do they exist during life?

14. *The Albumen of the Blood in Cholera.* (Lancet, June 9, 1866.)

The researches of M. Fernaud Papillon on the chemical and physical constitution of the blood in cholera have been published in the *Journal de l'Anatomie* (No. 2), and deserve the notice of the profession. His observations on the nature of the albumen removed from the blood of cholera patients during the algid period show that the fluid differs materially from the normal albumen. The albumen was separated from the corpuscles by repeated filtrations. The following are the results of M. Papillon's experiments: (1) This albumen, placed for four days in water, became neither hydrated nor swollen; it remained just as it was when first added, although ordinary albumen is either dissolved or swells up under the same circumstances. (2) It does not dissolve in potash or soda, even at an elevated temperature, although ordinary albumen is soluble in these reagents, even at ordinary temperatures. (3) When treated with hydrochloric acid, it slowly dissolves, and the solution, instead of having the usual deep violet color, is only faintly tinted. (4) At the ordinary temperatures, common albumen decomposes rapidly a mixture of nitric and sulphuric acids, nitrous vapors being disengaged. Choleraic albumen does not do so at the ordinary temperatures. Ordinary albumen is very rapidly dehydrated by sulphuric acid; the choleraic albumen is affected only after a long exposure.

15. *Termination of Motor Nerves in the Muscles.* (Lancet, July 21, 1866.)

The views of Dr. Beale relative to the mode of termination of the nerves in the muscular tissue have been pretty generally accepted in this country. Most British microscopists hold with the King's College Professor in believing that the nerves have no decided termination in the muscles, but that their ultimate fibres unite in forming a network of extreme delicacy. Abroad, however, this view has met with some opposition, and especially from MM.

Kühne and Rouget, the latter of whom has just presented a memoir to the Academy of Sciences upon the above subject. M. Rouget states that the nerve-fibre ends in a sort of terminal *plate* or disk; and in answer to Dr. Beal's denial of such a mode of termination he writes: "I shall only reply, that all other observers who have devoted themselves to this subject, MM. Krause, Kühne, Waldeyer, Engelmann, and Letzerich, and still more recently, MM. Conheim and Vulpian, have all admitted the existence of the terminal plate, and its entire independence of any nervous network." M. Rouget laid before the members of the Academy some photographs of microscopic preparations of tissue, which he said demonstrated the following conclusions: (1) The terminal division of the *axis cylinder* of the motor nerve-fibre constitutes by anastomosis and fusion a terminal expansion of finely granular substance identical with that of the terminal filaments of the corpuscles of Pacini, of the ultimate nervous lamina of electric plates of fishes, etc., and in immediate contact with the contractile substance of the primitive bundle. (2) This nervous expansion is traversed in every direction by minute canals, establishing a connection between the numerous nuclei of the *plate*, and communicating probably, on the one hand, with the space intermediate between the sarcolemma and the contractile fibrillæ, and on the other hand with the interstice between the matrix of the nervous tube and the medullary layer—an arrangement which is doubtless related to the special action of certain poisonous substances upon the terminal extremity of the motor nerves of animal life. M. Rouget's paper will be found in the *Comptes Rendus*, June 25th.

16. *Absorption Power of the Skin.* (Lancet, July 21, 1866.)

From numerous experiments, M. Scoutetten, the great authority upon mineral waters and their electricity, draws the following deductions as to the facility with which certain substances are absorbed by the skin: (1) The rapidity of absorption depends upon the tenuity of the molecules of the substance applied, and its facility of mixing with the fatty secretion of the skin. (2) Gases traverse the pores of the integument with great rapidity. (3) Liquids which pass easily into the gaseous state are quickly absorbed: such liquids are ether, chloroform, essential oils, benzoin, and turpentine. (4) Solid bodies susceptible of volatilization also penetrate the skin rapidly: such are camphor, musk, castoreum, etc.; cantharides is absorbed because of its essential oil—cantharidine, which may be volatilized. (5) The solid bodies, non-volatile, require to be mixed with fatty or oily substances, and to be applied with friction. They thus unite with the natural fatty matter of the sebaceous glands, and become absorbed.

17. *Urachus Pervious after Birth.* (Boston Medical & Surgical Journal, Sept. 6, 1866.)

Dr. G. J. Townsend communicates the following description of a case of this rare condition:

Many years ago, while residing in South Carolina, I was asked to see a little negro, five days old, of mixed parentage, and was told he was passing his water through his belly. On inspection, sure enough, every time the

infant cried, or made any great exertion, the urine bubbled freely from the umbilicus. The cord had separated normally, and the child was in every other respect vigorous and healthy. There was very evident ulceration of the surface, left by the separation of the cord. The question whether the urethra was pervious was solved at the time of the visit in the affirmative, a fair stream spirting forth *per vias naturales.*

The presence of ulceration at the orifice of the abnormal duct rendered the process of obliterating it very simple. The ulcerated surface was freely cauterized, and the edges of the opening were brought into close apposition and kept there by a strip of adhesive plaster, firmly applied in a longitudinal direction. This was still further secured by a compress of cork covered with wash leather, and kept in place by being stitched to a close fitting swathe.

The presence of ulceration in this case may be thought to have some bearing upon the question as to the manner in which the cord separates, whether by a process of ulceration or absorption. But the ulceration was evidently an accident here, and caused by the acrid fluid passing constantly over a new and delicate surface, and was healed at once by the arrest of the flow. The patient was well in four days, when the swathe was removed.

Cases of this kind are believed to be very rare, the urachus shriveling up in the human fœtus in the earlier stages of fœtal life. Instances are referred to by Wilson, Erichsen, and others, of its remaining pervious till birth, and of the existence of calculi in it. I have not been able to get a full description of any of the cases, and this is the only one I have ever seen.

18. *Transmissibility of Tubercle by Inoculation.* (Medical Times & Gazette, Nov. 24, 1866.)

Prof. Lebert, of Breslau, in a paper recently read at the Academy of Medicine, gave an account of some experiments which he has made upon the transmissibility of tubercle by inoculation. In place of venous injections, by means of which M. Villemin has also proved its transmissibility, he employed subcutaneous injection, the quantity of either gray or yellow tubercular matter injected, diluted and triturated with distilled water, varying from ½ to 1 gramme. Guinea pigs and rabbits were the animals selected, and as a consequence of these injections tubercles (in no wise differing in their microscopical characters from those found in man) were found in the lungs, liver, speen, and the lymphatic system.

VARIA.

Prize Offered by Dr. John O'Reilly.—Dr. O'Reilly, of this city, has placed six hundred dollars to the credit of the trustees of the Academy of Medicine, and suggests to that body the propriety of offering this sum as a premium for the best "Essay on the vital or ganglionic nervous system, the oxygen and the blood, and the cerebro-spinal nervous system." At the last meeting of the Academy the

matter was referred to a special committee, who will report their action in the premises at a subsequent meeting.

Dr. Mary Walker, of this city, is creating a heavy sensation in London, but her experiences there, we judge, will not prove among the sweetest of the "pleasures of memory," nor will they tend either to advance the cause of which she has voluntarily assumed the championship or add greatly to her individual reputation. We gather from the English journals the following notices of her appearance as a lecturer in St. James' Hall. Her subject was, "The Experiences of a Female Physician in College, Private Practice, and in the Federal Army."

"The audience was of a very mixed description, the greater portion being evidently actuated by curiosity to see and hear the lecturess, whilst a certain section, which mainly occupied the upper gallery, was as evidently bent upon getting the greatest possible amount of fun out of the proceedings. To beguile the tedium incident upon a little delay which took place ere the lady appeared, this compact body chanted with stentorian voices the Federal army chorus:

'Glory, glory, allelulia,
As we go marching on.'

Any slight monotony which the constant repetition of this war-song might have created was avoided by interspersing it with 'Rule Britannia,' and the more familiar but less refined 'Slap, bang!' Her dress was a long dark cloth tunic, reaching nearly to the knees, fitting closely to the figure above and expanding below, open to a certain extent in front, so as to disclose an inner garment, which we dare not attempt to name, but which served the purpose of a waistcoat, and carried a watch and chain disposed as is usual among men. Dark trousers ('pantalettes,' she called them) and boots like those ordinarily worn by the male sex completed the essentials of her costume. She had, besides, a light wreath of dark green leaves upon her hair, a turn-down collar and neckerchief, whilst shirt-wristbands peeped from her sleeves and partially concealed the white kid gloves upon her hands. She wore an order given her by the United States Government. She described her own costume as a 'physiological dress with moral bearings' (taken, we presume, from the shoulder). We cannot say much for her lecture. The early part was as prosy as any thing we had the ill fortune to hear in our student days. The description of the obstacles she met with in her course of study chiefly harped upon one string, dress. Indeed this essentially feminine trait disclosed itself throughout her discourse. One could discern the tone of a woman in whom an

otherwise laudable desire for a convenient and reasonable costume was swallowed up by the little feminine vanity which accompanies singularity. And so there was enough talk of short petticoats, pantalettes, and ankles to cause considerable surprise amongst the female portion of the auditory, as yet unaccustomed to the 'go-a-headness' of our Yankee cousins. The lecture was an undertaking altogether above her powers, and its only result has been to throw ridicule on herself, her sex, her profession, and her country, and to strengthen the opinions of those who hold that women had better not meddle with physic."

Another journal, in describing the lecture, says: "As a composition it was an entire failure, and clearly had never been revised by any educated gentleman before delivery. It professed to be an account of the Doctor's experience at college, in private practice, and in the army; but so far as actual facts, anecdotes, or descriptions were concerned, it was meagre and unsatisfactory to the utmost. Self-consciousness, or vanity, or egotism, call it what you will, and that of an unmistakably feminine order, gave the predominant key-note to the address. Let the topic be what it might, college, practice, or military adventure, the speaker involuntarily brought in the subject of dress, and this not merely in its physical and objective bearings, but also in their delicate subjective relations, to which the mind of even a female physician is shown not to be insensible. The Doctor's evident consciousness of sex was one of the characters which contributed to make the entertainment painfully ridiculous. In thus speaking freely of this melancholy exhibition, we do not forget that a female physician is one thing, a female lecturer another. If a woman choose physic as a vocation, and follow it through its wearisome and disgusting studies, we respect if we do not commend her, and certainly no word of ours shall tend to deprive any female physician of her claim to unprejudiced trial. If women are clearly not fit to practice physic, the race must die out; if they are, let them. It may be a mistake, but is no business of ours. To come forward as an orator in a public hall is quite another thing. Dr. Mary Walker's entertainment, apart from the interest which the presence and costume of the lecturer created, was vapid and thin, showed no intellectual grasp or solid foundation, and when it was enriched with a bit of the pathetic or sublime, threw the auditory into convulsive shrieks of laughter. It was listened to with contemptuous good nature, intermixed with occasional unmannerly interruptions from a gallery said to be filled with medical students, and with an ironical cheer at its close. The Doctor may be consoled by reflecting that if she had been a man, the whole thing would have been unequivocally

damned in five minutes and the room in an uproar. The interruptions and jocularities she experienced were not an insult to her sex, but to her capabilities as a public lecturer." The *Medical Press & Circular*, with a bitterness and intensity of satire surpassed only by its coarseness, styles her the American Medical Nondescript, and suggests as an attractive subject for her public entertainments, "Why Not? or, Clitoridectomy and its Uses."

DEATH OF DR. HORACE GREEN.—Died, at his residence at Sing Sing, on the Hudson, on the 29th day of November, Dr. Horace Green, in the sixty-fourth year of his age. Dr. Green was born in the town of Chittenden, Vermont, on the 24th of December, 1802. He was of the seventh generation of his family in this country. His father and three brothers served in the army during the revolutionary war, his father being the only one of the brothers who survived that struggle. Dr. Green studied medicine in the office of his brother, who was a practitioner of reputation in Rutland, Vt., and was graduated at Middlebury in 1824, in the institution subsequently known as the Castleton Medical College. After his graduation he practiced medicine in connection with his brother in Rutland, until the fall of 1830, when he went to Philadelphia, where he passed the winter in attendance upon the lectures at the University of Pennsylvania. Returning the following spring to Rutland, he continued to practice there till 1835, when he removed to New York, where he has since resided. In 1838 he visited Europe, and shortly after his return to New York, in the same year, he commenced his investigations into the pathology and treatment of those diseases of the air passages, with which subject his name is so indissolubly associated. From 1840 to 1843 he was connected with the Medical College in Castleton, Vt., as professor and president of the faculty, lecturing upon the Theory and Practice of Medicine. In 1850 he united with several distinguished medical gentlemen in founding the New York Medical College. In this institution he also occupied the chair of Theory and Practice of Medicine, and was elected to the presidency both of the Faculty and the Board of Trustees. He continued to lecture in this college till 1860, when he was elected Emeritus Professor, retiring at that time from active participation in the duties of a teacher.

He received the honorary degree of A.M. from Union College, Schenectady, and in 1853 the degree of LL.D. from the University of Vermont, at Burlington. He was a member of the Phi Beta Kappa Society and of the Society of the Cincinnati.

In 1854 he established, in connection with his colleagues of the college, the American Medical Monthly, with the editorial department of which he was connected till 1857, continuing to contribute to its pages, however, until it was suspended, in 1862.

Dr. Green was a member of several learned societies, both at home and abroad, to many of which he contributed valuable papers. Among these, which were subsequently published in the medical journals of the day, may be enumerated: Observations on the Influence of Malarious Atmosphere in the Prevention and Cure of Phthisis Pulmonalis (N. Y. Journal of Med. & Surg., Jan., 1840). On the Effects of Ergota in Parturition, with cases (N. Y. Journ. of Med. and Surg, Jan., 1841). Treatment of Epilepsy (N. Y. Med. Gaz., March, 1853). On the Subject of Priority in the Medication of the Larynx and Trachea (American Medical Monthly, April, 1854). Some Important Observations on Aphonia, arising from Organic Lesions (American Medical Monthly, August, 1854). Remarks on Croup and its Treatment (American Medical Monthly, June, 1854). On the Employment of Injections into the Bronchial Tubes and into Tubercular Cavities of the Lungs (American Medical Monthly, January, 1855). Report on the Use and Effect of Applications of Nitrate of Silver to the Throat, either in Local or General Disease (Trans. American Medical Association, 1856). Lesions of the Epiglottic Cartilage (American Medical Monthly, October, 1857). Croup, its Treatment by Cauterization and Catheterism of the Larynx (American Medical Monthly, February, 1859). On the Difficulties and Advantages of Catheterism of the Air Passages in Diseases of the Chest (American Medical Monthly, February, 1860).

His published works, written while pursuing an extensive and laborious practice, were: A Treatise on Diseases of the Air Passages, 1846, which has reached the third edition. The Pathology and Treatment of Croup, 1849. On the Surgical Treatment of Polypi of the Larynx and Œdema of the Glottis, 1852. Selections from the Favorite Prescriptions of Living American Practitioners, 1858, which has received a French translation. A Practical Treatise on Pulmonary Tuberculosis, 1864.

Few men in the profession of medicine in this country have attracted so much attention to their professional career as did Dr. Green. Announcing, in his earlier writings, a plan of treatment for diseases of the air passages which was at once regarded as "bold and novel," it met, naturally, much skepticism and opposition. This induced discussion, and from discussion arose a more thorough investigation

into the subject in dispute. An impetus was given to the study of laryngeal diseases, and, as a result, the means of their diagnosis and treatment have been immeasurably increased.

Dr. Green lived to see the views he promulgated thoroughly proved by the aid modern science has placed in our hands. Fearless by nature, and endued with a strong religious sentiment, he gave to the study of his profession a sincere earnestness, which is apparent in all his writings. A part also of his religious character was his faith, and this too was plainly observed in his professional life as well as in his daily walk and conversation. He believed in the sacredness of his stewardship, and labored to fulfill its duties. A long and weary illness, the result of over-labor, terminated his life.

Death of Lady Holland.—The decease is announced of Lady Holland, daughter of Sidney Smith and wife of Sir Henry Holland, M.D., D.C.L., etc., physician in ordinary to Queen Victoria. Lady Holland was the author of the well known biography of her father, the witty canon of St. Paul's, and possessed no slight share of his humor and literary ability.

A Real Leveler.—The *Nobles' Gazette*, of Moscow, contains this curious phrase: "Until now, thanks to the visible protection of Providence, the cholera had only attacked the lower classes; but at present the terrible scourge attacks the middle classes and even the nobility."

The Connecticut State Insane Asylum.—After a somewhat protracted and lively contest on the part of several places desiring to secure the location of this institution, Middletown has been selected by the commissioners as combining the greatest advantages. A fine farm of two hundred acres, with a beautiful river and valley prospect, has been selected on which to erect the buildings. Dr. A. M. Shew, lately Assistant Physician in the State Lunatic Asylum at Trenton, N. J., has been appointed Superintendent of the new Asylum. He brings to his position ample experience and superior qualifications.

Casualties to Medical Officers during the late War.—From the report of the Surgeon-General we take the following statements: The number of casualties from the commencement of the war to the present time, in the regular and volunteer medical staff, is ascertained to be 336, including 29 killed in battle, 12 killed by accident, 10 died of wounds, 4 died in rebel prison, 7 died of yellow fever, 3 died of cholera, 271 died of other diseases. During the war, 35 medical officers were also wounded in battle.

ARMY MEDICAL AFFAIRS.—(From the report of the Secretary of War.) Arrangements will soon be consummated by the Medical Department for the permanent security of its valuable mortuary records, including 16,000 folio volumes of hospital registers, 47,000 burial records, 16,000 hospital, muster, and pay-rolls; alphabetical registers of the dead, containing 250,000 names of white and 20,000 of colored soldiers, and the pathological collection constituting the Army Medical Museum. During the year official evidence, obtainable from no other source, of cause of death, or of discharge for disability, has been furnished in 49,212 cases, and 210,027 discharges upon certificates of disability have been examined and classified. The total number of surgical cases classified and recorded is, of wounds, 133,952, and of operations, 28,438. The preparation for publication of the medical and surgical history of the war has been prosecuted with much energy, much of the manuscript and several of the illustrations for the first volume being completed. The army medical museum continues to increase in value and usefulness, and the greater security and additional accommodations of the building to which it will be shortly removed admit of the addition of a great number of interesting and instructive specimens not hitherto available for want of space. The number of Acting Assistant Surgeons in the employ of the government has been reduced from 1,997, on the 1st of July, 1865, to 264, on the 1st of July, 1866.

THE PARIS FACULTY OF MEDICINE.—The anticipated changes in this school have taken place. Trousseau, Andral, Cruvelhier, and Piorry have resigned. Jobert, as has already been announced, hopelessly insane, has been consigned to a madhouse, and during the year Malgaigne, Rostan and Guillot have died. Velpeau and Bouillaud alone remain of the old set that once made this school so famous, and the latter of these two gentlemen is expected soon to retire. Velpeau, seventy-five years of age, is as fresh, active and regular at his work as twenty-five years since. The opening of the school took place on the 3d of November, and is described as having been very uproarious—a perfect bear garden, indeed—hideous noises, party cries, and thundering choruses taking the place of the respectful decorum which the presence of illustrious and beloved professors was once wont to inspire. The only tangible grounds for this demonstration appear to have been a general dissatisfaction with things as they are, and a desire to see the *concours* re-established. M. Broca will probably be named to fill one of the vacant surgical chairs.

Dr. William Marsden, of Quebec, has been appointed, by the College of Physicians and Surgeons, delegate to the next annual meeting of the American Medical Association, and announces his intention to read a paper at the meeting "*On the Infectious Character of Asiatic Cholera; its Portability and Communicability.*" With a view of making the paper as complete as possible, he solicits correspondence from any of the profession who may be able to present facts sustaining these views. Address as above.

Justice's Justice in France.—At a recent meeting of the Medical Association of the Moselle an extraordinary pretension on the part of a patient, which was supported by a *juge de paix*, was detailed. The client, summoned to discharge his doctor's bill, resisted on the following frivolous grounds: "I sent," said he, "for the doctor but once, and therefore owe him but for a single visit. If he came several times, that was at his own desire. It is true he has cured me of a very serious disease, which has prevailed epidemically in the village, and in order to arrest its progress he cauterized my throat several times. That is true enough, but I never requested him, and am only willing to pay for his first visit." The *juge de paix*, falling in with this view of the transaction, decided against the doctor, who therefore had the costs to pay. On another occasion this *juge de paix* insisted that the doctor should prove by witnesses that he had been sent for several times by his patient, and on his refusing to do this gave the decision against him.

Dr. Samuel G. Armor, of Detroit, Mich., Professor of the Institutes of Medicine in the University of Michigan, has accepted the chair of Therapeutics, Materia Medica, and General Pathology in the Long Island College Hospital, Brooklyn, N. Y.

Imperial Honor to the Profession.—It has been remarked that nearly every profession but that of Medicine was represented in the French Senate. This anomaly has struck the Emperor, it would appear, as the *Evénement* announces that his Majesty's physician, Dr. Conneau, is to be promoted forthwith to a seat in the Luxembourg.

A new Journal of Anatomy and Physiology, to be published semi-annually, under the direction of Professors Humphrey and Newton, of Cambridge, Dr. Turner, of Edinburgh, and Prof. Wright, of Dublin, is announced.

M. Dumas has been nominated honorary professor of the Paris Faculty of Medicine.

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ORIGINAL COMMUNICATIONS.

The Histological Doctrines of M. Robin. By William T. Lusk, M.D., New York.

(Continued from page 257.)

NO. II.—BONE, NERVES AND EPITHELIUM.

Bone.—The bony substance is characterized by certain peculiar cavities termed, by M. Robin, *Osteoplasts.* These cavities are stellate in form, and are united with one another by fine canals of a diameter not exceeding .001 They are characteristic of bone. Wherever we find them in a pathological product, we have real bone to deal with, identical, not only in structure, but in chemical composition. Osteoplasts are cavities containing simply a liquid, and not anatomical elements. The canaliculi which radiate from the osteoplasts are frequently sixty in number, whereas the prolongations of the stellate fibro-plastic bodies never exceed five.

Cartilage.—In the adult we have two varieties: 1st, Permanent Cartilage; 2d, Fibro-Cartilage. At an early period of existence we have fœtal cartilage. *Permanent Cartilage* is the form found in the larynx, trachea, bronchi, joints, and connecting the ribs to the sternum. The so-called Tarsal

Cartilages and Articular Meniscs are really fibrous tissue. Permanent cartilage is characterized by the presence of large oval cavities, termed *Chondroplasts.* These cavities are filled with cells (one, two, or more), which multiply by segmentation. *Fibro-Cartilage* exists in the nose, the Eustachian tube, and external ear. It contains chondroplasts like the permanent variety; but its substance, instead of being transparent like the latter, contains a great number of connective tissue-fibres, which are but little affected by acetic acid. Cartilage treated with boiling water furnishes chondrine; bone treated in the same way furnishes gelatine. These substances are chemically different, so that bone is not simply cartilage in which phosphate of lime has been deposited. When cartilage is transformed into bone, its organic substance gives place to another.

In studying its *development* we should hold in mind that bone is a complex organ, the combination of four tissues in the same organ, viz., periosteum, bony and cartilaginous substances, and marrow. There is sufficient difference in the manner in which the following bones are developed to render for each a separate description necessary: the vertebra, the femur, the inferior maxilla, and the parietal bone.

The *Vertebra* is the first bone which appears in the fœtus. At the time when the embryo is still composed of embryoplastic nuclei, the future spinal column is represented by a closed tube formed of a hyaline substance filled with cells of a special kind. Next we notice at intervals around the tube (dorsal cord) little circular collections of peculiar nuclei, which are the points of departure of the vertebræ. Between these nuclei there is deposited a soft, transparent amorphous matter, constituting, with the nuclei, the cartilage which is to form the vertebræ (*embryonic cartilage*). Subsequently the dorsal cord becomes atrophied at the parts occupied by the bodies of the vertebræ, but persists at the level of the intervertebral disks, where traces may still be found as late as the twelfth or fourteenth year.

Development. Each nucleus is contained in a little cavity which it exactly fills. This cavity is the origin of the chondroplast. As the cartilage grows the chondroplasts increase in size, soon becoming much larger than their nuclei. They

differ, however, in form from those of permanent and fibro-cartilage, being smaller and angular. This variety is termed *fœtal cartilage.* As the wall of the chondroplast in its growth no longer comes in contact with its nucleus, there is deposited a finely granular substance, which becomes the body of the cartilage cell. Gradually the fœtal cartilage loses its annular form and assumes nearly the normal shape of the body of the vertebra. Then in certain points absorption takes place in the substance of the cartilage, canals forming in which capillaries appear. Subsequently particles of lime are deposited in the centre of the cartilage. This is the beginning of the osseous substance. Around this centre we notice the chondroplasts become round, change their positions, and dispose themselves in series like radii, which are separated from one another by a thin layer of cartilaginous substance. Between these series the osseous substance advances. The cells in the interior of the chondroplasts shrivel and disappear. The osseous substance thus primitively formed is granular, and much less transparent than that of later date. According to M. Robin, the osseous substance, as it invades the cartilage, forms rounded spaces about .040 in diameter, which are doubtless osteoplasts in the process of growth. This much is certain, that when the osteoplasts are round, and measure .040 in diameter, they are empty. Gradually these spaces retract, assuming the characteristic appearance of osteoplasts, while canaliculi form, connecting them with one another. At the same time the previously granular osseous substance now becomes more transparent. At the centre of the vertebra these characters are already marked by the time ossification has reached the periphery.

To the granular osseous substance which precedes the perfect development of bone, M. Robin has applied the term *osteoid.* In the earliest periods the osteoplasts are not arranged regularly about the Haversian canals. They assume this disposition in the interior of the bone in the course of further development. When the ossification of the body of the vertebra is complete, the *periosteum* makes its appearance. The periosteum is a layer of connective tissue covering the body of the vertebra, but separated from the bony substance proper by a thin layer

whose study is of great importance. It is composed of an amorphous matter, in which sometimes, but not always, very small cavities may be seen. These are chondroplasts of a special cartilage, called, by M. Robin, "*cartilage par envahissement.*" This form sometimes contains nuclei, resembling those of the embryonic cartilage about the dorsal cord. In other respects, as, for instance, in regard to softness, transparency, etc., it presents the same properties as embryonic cartilage. In operations where we wish for the restoration of bone, it is necessary to raise this layer with the periosteum.

Development of the *Femur*. At a certain period of fœtal life, the femur is composed of fœtal cartilage. This cartilage is not vascular. It is surrounded by a perichondrium formed of fusiform bodies. About the 45th day of fœtal existence the first point of ossification appears on the inner side of the central portion of the diaphysis. This point soon becomes a disk occupying the entire diameter of the bone, and gradually advances toward the extremities in the same way that ossification takes place in the vertebra. When the process has advanced to a certain extent, cavities of two kinds take place by absorption in the osseous substance. In the one case they are oval, and are destined to contain the marrow, which is subsequently formed. They become united in the course of time, and constitute the medullary canal. In the second instance, the absorption takes place from the periphery toward the centre, forming a bony canal for the nutrient vessels. These vessels are prolonged into the fœtal cartilage composing the epiphyses, in which, subsequently, points of ossification are developed, which unite with the bony substance of the diaphysis. During the period of its growth, the femur is covered by a layer of *cartilage par envahissement.* At the articular extremities the chondroplasts shrivel and become round at an early moment, thus giving rise to *articular cartilage*, which never ossifies nor becomes vascular. All long bones, even the metacarpal and metatarsal, grow in the same way as the femur.

Development of the *Inferior Maxilla*. At a time when the greater portion of the embryo still consists of embryo-plastic tissue, the malleus of the ear exists in the form of fœtal cartilage. The process that passes to the tympanum is then very

long, and bears the name of the cartilage of Meckel. It extends through that part of the embryo known as the superior visceral arc, which is still formed solely of embryo-plastic nuclei. The extremity corresponds to what is to be the symphysis of the chin. Suddenly a bony lamella, without any antecedent cartilage, appears external to and in contact, but not in continuity, with the cartilage of Meckel. As the lamella increases in size, cavities form in its external surface, which become closed in as the development progresses, and constitute the osteoplasts of the new bone. At first they are small and devoid of canaliculi. Subsequently the periosteum forms, and envelops at the same time the bone and the cartilage of Meckel. The latter finally disappears. At the posterior extremity of the maxilla, a thin layer of *cartilage par envahissement* forms and becomes the source of the condyle and the coronoid process. At a later period an extremely thin layer of the same cartilage surrounds the entire maxilla. The same form of development, without antecedent cartilage, by *immediate ossification*, is found in all the bones of the face.

The *parietal bone*, as in the preceding case, appears without pre-existing cartilage, only at a later period, and in the midst of the fibrous envelope of the brain, which separates into two layers, the external forming the pericranium, the internal forming the dura-mater. The bone advances from the first point of ossification by rather irregular processes into the fibrous tissue. The osteoplasts form in the same way as in the maxilla. At certain points, but not in all, there may be observed *cartilage par envahissement* bordering the processes already described.

Bones which are developed like the parietal and maxillary present the greatest anomalies. They are the only ones which unite with advancing age. *Heterotopy* of osseous substance is common. We find it taking place in the skin, the lymphatic glands, the breast, and in the pleuræ. In *enucleating* bone we should remove the *cartilage par envahissement* with the periosteum. For this reason we should scrape carefully the surface of the bone, and not the periosteum. The success of the operation depends simply on our preserving the necessary conditions for the repair of the osseous substance. When *tendons ossify*,

the process always starts from the bone and advances into the tendon, which gradually atrophies. The bony substance in this case is always preceded by a layer of *cartilage par envahissement*. *Bony stalactites* are formed in the same way. The formation of *callus* begins with reabsorption of all the tissues between the fragments. They are replaced by a mass of granular amorphous matter, while at the same time, in the medullary canal of each fragment, there forms a plug of connective tissue-fibres (internal callus). A thick layer of *cartilage par envahissement* then covers the extremities of the fragments, passing at the same time over the plugs.

In studying the *pathology* of bone, we are to take into account the various tissues of which it is composed. The *periosteum*, formed of connective tissue, may become the seat of the various tumors peculiar to that tissue. We have already referred to certain morbid changes occurring in *marrow*, especially to those due either to the hypergenesis of the medullo-cells or the myeloplaxes. It is proper here to state that the formation of *tubercle of bone* takes place in the osteoid layer. The small polyhedral bodies that have been considered as tubercle corpuscles are really, according to M. Robin, medullo-cells, altered in shape by reciprocal pressure. *Infiltrated tubercle* takes place in the spongy substance, and is accompanied with productions of leucocytes. The *cartilaginous tumors* are always heterotopic. They are composed of all the varieties of cartilage, and are frequently ossified at the centre. The fœtal and embryonic forms predominate. A tumor formed of embryonic cartilage may be fluctuating, reproducing the condition of the bodies of the vertebræ about the dorsal cord. In the interior of joints the permanent cartilage often presents small pediculated vegetations. These frequently become detached and float in the synovial fluid of the joint, playing the part of foreign bodies there. That two bones may *anchylose*, it is essential that the cartilage of each should disappear, either by reabsorption or molecular necrosis (ulceration). In the *aged*, cartilage frequently presents perpendicular fissures, parallel to one another, and occupying its entire depth. This is a senile case of segmentation of an amorphous matter, but taking place only in one direction. It has been termed *fissuration*, by way of distinction. This

process frequently permits the escape of the cells from the chondroplasts.

Necrosis is the sudden death of bone and is attended with no special alterations. In *caries* the medullary substance fills with little drops of fatty matter. The osteoplasts fill with fatty, and, at times, with dark granulations. *Osteo-malacia* consists in the reabsorption of the osseous substance. *Rachitis* is constituted by the presence in the bone of a certain number of layers composed of osteoid tissue. *Eburnated tumors* of bone are composed of compact osseous tissue without medullary cavities, and with but few Haversian canals. In structure they are completely analogous to the petrous bone.

The Nervous System.—M. Robin has termed *myelocytes* certain elements found only in the gray substance of the nervous centres, and in the retina. They present the two usual varieties: 1st, nuclei, which are gray and round, measuring about .007; 2d, complete cells without walls, in which the nuclei occupy the centre.

Nerve-cells are found in the gray substance, in the retina, in the mucous membranes, and probably elsewhere. They vary greatly as to form and dimensions. Thus they may be unipolar, bipolar, or stellate. At times the cell is very small; again it may be quite large, and always contains an oval central nucleus. Frequently the nucleus contains a brilliant yellow nucleolus. The substance of the cell is filled with gray granulations, and sometimes, in certain regions, with large, orange-colored, fatty granules. It is impossible to detect the existence of a cell wall. Nerve-cells present nearly always one or more prolongations, formed of the same substance as the cell, but without the gray granulations. These prolongations are flattened, and very long, and are termed *axis cylinders.* A portion of these pass directly into the white substance of the nervous centres. Others ramify, the branches anastomosing with contiguous cells, or passing, as in the previous case, into the white substance. Here the cylinder axis is surrounded by a sheath, formed of a special substance called *myeline.* Myeline has nearly the consistency of turpentine, and is white by reflected, yellow by transmitted light. It possesses the microscopical peculiarity of presenting a double

contour. This is a purely optical property, and may be observed not only in the sheaths, but in the globules of myeline which form after death. When death occurs the sheaths soften, and as they possess no investing membrane to maintain them in the white substance, they form little globules, which retain, as previously stated, the double contour. Another peculiarity of the sheaths is their opacity, preventing our seeing the axis cylinders contained in them. The axis cylinders, together with the sheaths of myeline, take the name of the *nerve-tubes of the centres.* They are found only in the white substance of the centres, in the retina, and in the optic, acoustic and olfactory nerves. The nerve-cell, the cylinder axis, the myeline and the nerve-tubes are only artificial divisions of the nerve element proper.

The *fundamental element* of the *gray substance,* considered as a tissue, is the nerve-cell. All the nerve-cells anastomose with one another. The nerve-cells and the myeloyctes form alternate layers, with intervening amorphous matter. The gray substance presents the following varieties: 1st, normal variety. 2d, the gelatinous substance of Roland, in which the cells are large, abundant, and slightly granular. The amorphous matter is likewise slightly granular, and contains few myelocytes. The *ensemble* forms a tissue, so to speak, of a colloid nature. 3d, the cells are small, with dark yellow fatty granulations, and are contained in an amorphous matter, presenting similar characters. This is the variety present in the *corpora dentata* of the olivary bodies and the cerebellum, and in the *locus niger* of Soemmering.

In the *development* of the nervous centres, the amorphous matter of the *gray substance* first makes its appearance, then the myelocytes, and lastly the nerve-cells. These latter appear first as nuclei, around which the cell bodies and their axes form. By the tenth week a portion of the axes are covered with myeline, constituting the *white substance,* which represents simply an ulterior development of the gray substance.

The nerve-tubes of the centres are the *fundamental element* of the *white substance,* and compose the greater part of its tissue. The *accessory elements* are the capillaries, the amorphous matter, and the amyloid bodies (*corpora amylacea*). In the

spinal cord the gray substance occupies the centre, while the white substance is formed of nerve-tubes arranged in bundles. These bundles are separated by prolongations from the central gray substance, which form longitudinal partitions, containing nerve-cells and myelocytes. These partitions have nothing in common with connective tissue. There is no connective tissue in either the white or gray substance. In the posterior columns of the spinal cord, and in the floor of the fourth ventricle, we find, in adults, little round bodies, .015 to .020 in diameter, formed of concentric layers, which cause them to resemble grains of potato starch. This has given rise to a belief in the formation of starch in the economy. They are in reality, however, nitrogenous bodies, and are in no wise analogous to the isomeric compounds of cellulose.

The *peripheric nerve-tubes* may be considered as the true nervous element, although they are continuous with the axis of the nerve-cells. They are originally developed independently, and afterwards unite with the nerve-cells. They are composed of a central axis, a covering of myeline, and an extremely fine envelope, measuring less than .001 in diameter. The myeline of the peripheric nerve-tubes, therefore, when in the state of liquefaction which follows death, can only escape at the two extremities. Like the nerve-tubes of the centres, they offer an apparent double contour; due solely to the presence of the myeline. They are developed upon special nuclei, smaller than the embryo-plastic nuclei, and larger than those of the fibre-cells. These nuclei become united together by a filament of amorphous matter, differing in its chemical reactions from the connective tissue-fibres, and constitute the *fibres of Remak* (gelatiniform fibres). These, according to M. Robin, are young peripheric nerves (up to the third month). The radial nerve, up to the fifth month, is entirely composed of the fibres of Remak. They form the gray fibres of the grand sympathetic during the whole lifetime, representing a persistent embryonic state. The *white fibres* are developed from the fibres of Remak in the following manner: the latter become tubular; the axis cylinder appears in the cavity; the myeline forms between the axis cylinder and the wall, and from the latter the nuclei disappear.

All the sensitive nerve-tubes (not the motor) present in some part of their course a *ganglion cell*, which may be described as a nerve-cell with a wall proper. If we examine a nerve-tube we find a point in which the myeline disappears, and the axis becomes continuous, with a nerve-cell ordinarily of the bipolar variety. The wall of the nerve-tube becomes thickened, and forms about the cell a resistant envelope, in which small nuclei are found. Beyond the cell the meyline reappears, and the sensitive nerve-tube is again constituted. If a great number of sensitive nerve-tubes and their cells meet at the same point a *ganglion* is formed. The efferent nerves of a ganglion are frequently larger than the afferent ones. This is explained by the existence in the ganglion of a certain number of multipolar cells, which, while connected with the centre by a single tube, may give off several to the periphery.

In the tissue of the peripheric nerves, the nerve-tubes are united in bundles contained in sheaths of a special substance, tubular in form, termed *perineurium*. Each sheath in the trunks of important nerves contains from 50 to 60 nerve-tubes. The perineurium is very resistant to pathological action, and is never traversed by capillaries. As the nerve-tubes of each bundle separate, the sheath ramifies correspondingly, continuing to accompany the nerve elements to their most distant distribution; and when, finally, it envelops a single nerve-tube it still retains its primitive thickness. The perineurium commences at the dura-mater, whereas the walls of the nerve-tubes begin at the medullary substance. Between the sheaths and enveloping the nerve there is a certain amount of connective tissue present, forming the *neurilemma*. This connective tissue is vascular, and from its capillaries are derived the nutritive fluids necessary for the support of the nerve elements.

The *terminal extremities* of nerves are, 1st, Nerve-cells. In this case the nerve-tube loses its envelope, and its axis becomes directly continuous with a free nerve-cell, small in size, in the midst of the tissues. This mode is observed in the skin and mucous membranes. 2d, The free axis appears cut square off, and comes directly in contact with a special anatomical element called the "*bâtonnet*." This is an elongated,

narrow element, and always possesses a nucleus. We find this form in the retina (bacillar layer), in the pituitary body and the tongue, without our yet knowing whether these elements are specially reserved for sensation. 3d, The nerve-tube loses successively its myeline and its investing membrane, and the free axis terminates in a *point*. Sometimes, instead of a point, the extremity of the axis is thickened and spoonbill shaped (*en forme de spatule*). This occurs in muscles where the thickened portion is applied directly to the myolemma. 4th, In the three preceding cases, where the nerve-tube is enveloped with a sheath of perineurium, the latter disappears before the termination of the nerve-tube, about the same time, in fact, as the envelope proper. But in the following class the perineurium persists beyond the envelope and the myeline, so as solely to envelop the extremity of the axis. Its tissue is considerably thickened, and presents concentric layers and nuclei. This enlargement is sometimes small, measuring scarcely .050–.060, as in the papillæ of the skin covering the fingers, the palm of the hand, the sole of the foot, and in the papillæ of the tongue. Sometimes it is as large or larger than a grain of wheat. This variety is found *beneath* the skin of the fingers, the feet and hands, and in the peritoneum. The former are the *corpuscles* of *Meissner*, the latter those of *Pacini*.

The *elementary functions* of the nervous system are:

$$\left.\begin{array}{l}\left\{\begin{array}{l}\text{Impression,}\\ \text{Sensation,}\\ \text{Perception,}\end{array}\right.\\ \left\{\begin{array}{l}\text{Volition,}\\ \text{Motricity,}\end{array}\right.\end{array}\right\}\text{Transmission.}$$

In modern physiology all the functions are essentially distinct, and are accomplished by anatomical elements and regions, certain of which have been definitely ascertained. The functions of *transmission* are performed by nerve-tubes of all varieties. Thus, *sensation* is transmitted by tubes possessing a ganglion; the motion of involuntary muscles is always accomplished by the fibres of Remak. The organs of *impression* are the peripheric and terminal nerve-cells, as those of the skin, the mucous membranes, and, perhaps, the retina. In the same category may be considered the "*bâtonnets*," the corpuscles of Pacini and of Meissner. *Sensation* is the peculiar function of

the cells of the posterior cornua. It may be accomplished independent of our consciousness, as reflex actions prove. *Perception* is accomplished in the *optic thalami.* All the sensitive nerves terminate in the optic thalami, but never directly. *Volition* is accomplished in the *corpora striata.* It is to be considered as a distinct function from motricity. The corpora striata and the optic thalami have no direct connection, but communicate solely through the nerve-cells of the convolutions, which harmonize the functions with one another. If we could clearly define this action the result would be *thought.* The only nerve-cells endowed with *motricity* are those of the anterior cornua of the spinal cord. They may act either under the influence of the neighboring sensitive cells of the posterior cornua (reflex movement), or under that of the cells of volition in the corpora striata.

Some organs of impression, as the retina, for example, are separated from the optic thalami by several gray centres. In the same way many of the cells of volition of the corpora striata are separated from those of the motor function in the spinal cord by centres of gray matter, such as the locus niger, the corpora dentata, and the convolutions of the cerebellum. Thus, there are a great number of regions of gray matter in the nervous system of whose action we are ignorant.

During the period of repose of intermitting secreting glands, like the salivary, the fibre-cells of the vessels contract under the influence of the grand sympathetic transmitted by the fibres of Remak. If we galvanize the chorda tympani, which passes through the sub-maxillary gland and which is composed of nerve-tubes, the vessels dilate and the gland begins to secrete. There is, therefore, an antagonism between the two kinds of nerve elements, or rather the cerebral influence exercised through the nerve-tubes paralyzes that of the grand sympathetic.

When we *divide* a nerve, the myeline forms into drops in the investing membrane of the nerve-tubes, in the same way as in the cadaver. These drops gradually diminish and disappear. Then the axis and the envelope disappear likewise. But nerves are capable of *regeneration*, even when as much as two centimètres (.8 inch, nearly) have been removed. Regeneration takes

place in the same way as the original formation, *i. e.*, the future nerve-tubes begin as fibres of Remak. In prolonged *neuralgia*, especially of the trifacial nerve, the sheaths of perineurium are found filled with fat granules. The *neurilemma*, or connective tissue separating the sheaths, may become the seat of *hypertrophy;* or *fibrous tumors* may form, dissecting, in the process of growth, the sheaths of perineurium—not, as was supposed by the older surgeons, the nerve-tubes themselves. The *neuroma* is simply a disease of the connective tissue of the nerves. The *neurilemma* may further become the seat of glandular tumors (heteradeny), in which case the glandular elements may be produced in the interior of the perineurium, and destroy the nerve-tubes.

In the *aged*, the nerve-cells become more granular. A similar condition is found in certain cases of *insanity*. In others, the amorphous matter, interposed between the cells, becomes more or less abundant. M. Robin denies the existence of any functional trouble of the encephalon without some corresponding material alteration, either physical, organic or chemical. For example, in drunkenness, a certain quantity of alcohol, or its derivatives, must enter into momentary combination with the substance of the cerebral cells.

In the aged human subject, and in all aged animals, an alteration takes place in the capillaries, consisting in the deposition of calcareous and fatty granulations in the walls, which are thus rendered very brittle. Death, therefore, by *apoplexy*, is the natural consequence of advanced age.

Cerebral substance containing myelocytes and cerebral cells may be developed *heterotopically*. Tumors of this sort are of special frequency upon the internal surface of the dura-mater, where they are found separated from the brain by the pia-mater. Tumors, formed especially by the hypergenesis of myelocytes, are found in the brain, and are known as *cerebral tubercles*. Occasionally they contain, in addition, nerve-tubes of the centres and cerebral cells. They pass very rapidly from the centre to the periphery into the phymatoid state. In these tumors, the so-called *corpuscles* of *tubercle* are simply deformed and granular myelocytes. Certain pathologists, observing a soft pathological tissue upon the surface of the

tumors, have concluded that the tubercle softened from the periphery toward the centre, whereas the soft tissue is in reality the most recent pathological formation which has not yet undergone phymatoid degeneration. In *softening* of the *gray substance* the process begins in the amorphous matter, the softening of the cells occurring soon after. In *softening* of the *white substance* the nerve-tubes become friable, and break easily, while between them leucocytes in a granular condition (corpuscles of inflammation) make their appearance. *Induration* (*sclero-cerebrale*) is frequently found in the cerebrum in *idiocy*, and in the cerebellum in *epilepsy*. It is characterized by the formation of a certain quantity of connective tissue in the brain substance. The connective tissue is frequently accompanied by calcareous concretions. When connective tissue is present in great quantity, the condition has been described as *gray induration* of the brain. When the connective tissue is developed in the white substance, its fibres follow the course of the nerve-tubes. In induration, whether of the gray or white substance, the nerve-cells and tubes are smaller than usual, finely granular, and frequently absent. The brain is likewise the seat of *tumors* of *connective tissue* which proceed from the *pia-mater*. They are often very vascular, and hence have been described as cases of *red induration*, the color being due to the blood contained in the vessels.

Under certain circumstances the posterior columns of the spinal cord become atrophied, and are found to contain great numbers of amyloid bodies. According to M. Virchow, this lesion is characteristic of *tabes dorsalis*. As was previously stated, these bodies have no connection with the starches, but contain nitrogen.

De Blainville designated the tissues which we have been considering the *constituent* or *fundamental tissues* of the body, because they essentially compose the organism. They contribute, in fact, to make up the framework of the body. They are the source of motion and sensation. As a rule they are formed by *genesis* in a blastema resulting from the liquefaction of the embryonic cells. They are generally vascular. The remaining tissues of the body De Blainville designated "*products*" (*tissus produits*), because they form upon the very bor-

ders of the constituent tissues, of which they seem to be a sort of secretion. They lack the material characteristics of the constituent tissues, and are to be regarded as organic superfluities, of which many of the lower animals are deprived. It is quite possible to suppose an animal possessing none of the "products," but not one destitute of connective tissue to give it form, or of tissues producing sensation or motion to fit it for its relations to the external world. The first of the "products" appearing in the embryo is produced by a metamorphosis of a certain number of embryonic cells, placed at the periphery of the vitellus.. These tissues are not ordinarly vascular, though they possess a considerable degree of vitality. By reason of their nutritive activity they play a considerable *rôle* in the pathology of the economy. Certain of them, as the epithelium of the serous membranes, the vascular system, etc., after appearing in the embryo, again disappear; others again are formed of elements which are continually renewed, new elements forming at each instant to replace those that have perished. In the constituent tissues, on the other hand, elements once formed persist. They may disappear by reabsorption, but never by falling externally.

Epithelium. M. Robin recognizes *four varieties*, viz.: 1st, the nuclear; 2d, the spherical; 3d, the prismatic; and, 4th, the pavement, polyhedral, or lamellar.

Nuclear epithelium consists of granular nuclei, spherical or ovoid in shape, sometimes crowded together, sometimes with intervals between them. In all cases, however, they are separated by sufficient amorphous matter to prevent their losing their shape by reciprocal pressure.

Spherical epithelial cells are rare in the human species. They are found only as an accessory element in the bladder, the thymus, etc. The nuclei of these cells occupy the centre.

Prismatic cells are in general elongated, and have an ovoid nucleus, whose long axis corresponds to that of the element. For this reason, when seen from above, the nuclei appear round. When the prismatic cells are disposed in layers, the superficial ones alone present the characteristics of the variety. In certain cases the gray granulations of the body do not extend as far as the free surface of the cell, leaving above a

transparent hyaline layer, which, however, forms part of the body of the element. This hyaline layer is a little harder than the rest of the element, and may separate in the form of a thin pellicle. Again, the substance of the cell may be prolonged into fine filaments (measuring from .001–.005–.006 in length), constituting the *ciliated* epithelium. During the life of the element, the ciliæ are endowed with a peculiar vibratory motion. This motion ceases after the death of the element, which ordinarly follows that of the individual by several hours. As the ciliæ form part and parcel of the body of the cell, they can possess no special motor organ.

Under *pavement cells* M. Robin classes *three* very different *orders*, as far as regards form. The *pavement cells proper* consist of little cubes placed in immediate juxtaposition, either in single rows, as in the choroid, or in several, as upon the conjunctiva. The *polyhedral cells* are always crowded together, and in immediate juxtaposition. The *lamellar epithelial cells* are much flattened and very broad. Ordinarily they are disposed in layers which may attain considerable dimensions, as upon the sole of the foot. All the epithelial cells can contain, normally or pathologically, gray granulations.

Genesis takes place, 1st, by transformation of embryonic cells; 2d, by genesis proper; 3d, by segmentation.

In the *second case* the nucleus first makes its appearance, and then the body of the element is developed upon it. Thus, in the case of the prismatic elements, the nuclei appear at the bottom of the epithelial layer, in contact with the subjacent tissues, and as they approach toward the periphery by the incessant desquamation of the superficial cells, they gradually assume the characteristic form. In the *genesis* of epithelial cells by *segmentation*, nuclei appear in a considerable quantity of amorphous matter. The amorphous matter then divides by segmentation around the nuclei, constituting thus an equal number of polyhedral cells.

In the ulterior development of epithelial cells, the nuclei may disappear, as, for example, in the case of the lamellar cells of the epidermis. All epithelial cells are destined to separate and pass from the economy. Epithelial cells may become granular, or pass into vesicles. They may present all sorts of deviations

from the natural form (fusiform cells, pyriform cells, excavated cancer cells), when they usually become the subjects of hypertrophy. The nuclei may be very numerous in certain cells, either from multiplication or from the imperfect segmentation of the amorphous matter. The nuclei may likewise become hypertrophied, and then contain nucleoli. No element of the body is equally susceptible of heterotopy.

Notes on Fractures of the Upper Extremity. By JOHN H. PACKARD, M.D., one of the Surgeons to the Episcopal Hospital, Philadelphia.

NO. V.—FRACTURES OF THE LOWER EXTREMITY OF THE RADIUS.

Fractures of the lower extremity of the radius are, as is well known, of very common occurrence. They usually result from falls on the palm of the hand, more rarely from direct violence, and very seldom, although within the knowledge of reliable observers, they have been due to falls on the back of the hand. The disability of the limb which ensues is often great and of long continuance, but is eventually, in almost every instance, wholly overcome. Not so the deformity; a peculiar projection of the lower end of the ulna inwards, with a prominence at the dorsal surface of the carpus, and a corresponding depression in front, and a real or apparent twisting of the hand towards the radial side, is apt to remain for life. To some patients this causes but little annoyance, the regaining of the use of the part being the object of prime importance. But to females, and even to men of good social position, the deformity mentioned is highly disagreeable, and should, if possible, be avoided. The present paper will be devoted to an inquiry into the causes of and the means of preventing such a result.

In this country, fracture of the lower extremity of the radius is often spoken of as "Barton's fracture," Dr. John Rhea Barton, of Philadelphia, having published, in 1840, in the *Medical Examiner*, a paper on "*Subluxation of the wrist, consequent to fracture through the articular surface of the carpal extremity of the radius.*"

British surgeons, on the other hand, give the name "Colles' fracture" to almost every case of the injury in question, from the fact of Mr. Abraham Colles, a Dublin surgeon, having published a paper on fractures "about an inch and a half above the carpal extremity of the radius," in the *Edinburgh Medical and Surgical Journal*, in 1814.

Two other names are known to readers on surgery in especial connection with these injuries: Voillemier, whose memoir on the subject was published first in 1842, in the *Archives Générales*, and subsequently, in his *Clinique Chirurgicale*, in 1862; and Prof. R. W. Smith, of Dublin, who has devoted a chapter to it in his most valuable work on "Fractures in the vicinity of Joints, etc.," which appeared in 1854. Besides these, Goyrand, Diday, and perhaps others, have written upon the pathology of these injuries, but not with so much emphasis or particularity, although several plans of treatment have been advocated with earnestness and ability by different surgeons.

As to the questions which have arisen, and which may still be regarded as open, in connection with this matter, they concern the direction of the fracture, the cause or causes of the deformity, and the mode of procedure to be adopted.

Colles, who wrote in 1814, describes very well the symptoms of fracture of the lower extremity of the radius, but seems not to have defined at all the direction of the breakage. Since his time, this has been done, and the test of dissection applied to the views proposed. By Barton, whose statements were, I believe, based wholly upon clinical observation, it was thought that "the fragment may be, and usually is, quite small, and is broken from the end of the radius on the dorsal side, and through the cartilaginous face of it, and necessarily into the joint." Goyrand supposed, on like grounds, that the fracture ran sometimes obliquely from above downwards and from behind forwards, and sometimes from above downwards and from before backwards, while in a third class of cases it was stellate, involving the joint, and constituting the *fracture en étoile* of Dupuytren. But when Voillemier inquired into the subject, studying specimens, he found that the fracture was always transverse; nor could he learn, from experienced surgeons, that they had ever seen it otherwise, except in the living sub-

ject, where it was easy to be deceived on this point. Prof. R. W. Smith, judging also from dissections, held the same view.

A series of eight experiments made by me, in March, 1864, led me to believe these statements of Voillemier and Smith to be correct, although at least one specimen has come under my notice in which the fracture was oblique downwards and *inwards*, separating the styloid process of the radius from the rest of the bone. The experiments referred to were performed by fixing the forearm and hand of the dead subject as nearly as possible in the position usually assumed by them in falls on the palm, and then striking the back of the elbow with a heavy mallet, in imitation of the effect of the weight of the body. In every case the radius gave way transversely above the wrist, the lower fragment being also for the most part broken into two or more pieces. (Circumstances prevented my making accurate notes of the condition of each bone on dissection.) In every case, also, the deformity produced was exactly that presented by like fractures occurring during life, the "silver-fork" shape of the wrist. Without attaching too much importance to these experiments, which I am well aware are by no means conclusive, it seems to me that they add some strength to the position of Voillemier and Smith, above quoted. Nélaton records a similar experiment made by him, with a like result.[1]

The specimen of oblique fracture, of which mention has been made, is in the museum of Prof. Smith, of the University of Pennsylvania; the annexed cut represents it accurately. It is without history. The main fracture affects the styloid apophysis of the radius; the styloid process of the ulna has also been broken off, and the hand is obviously in a state of marked abduction.

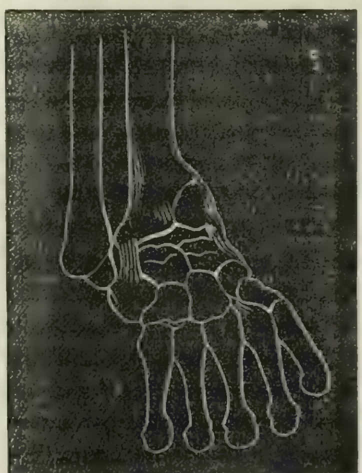
Fig. 1.

Hamilton speaks of two cases seen by him, in which the styloid process of the ra-

[1] Elemens de Pathologie Chirurgicale, tome i., p. 710.

dius was supposed to have been broken off, and quotes still another case, reported by Dr. Butler, formerly of the Brooklyn Hospital. Such cases are obviously, however, of rare occurrence.

A very curious and, I believe, unique case was reported by Dr. H. J. Bigelow to the Boston Society for Medical Improvement, in 1858, and published by them in their proceedings,[1] of a comminuted fracture of the radius, involving the joint, whence several lines of breakage ran upwards, without, however, reaching the surface of the bone. Almost always there is a transverse fracture, the lower fragment being broken up into two or more lesser portions; sometimes, as in the cases above mentioned—and I think in one or two others which I have myself seen—the breakage may be single and oblique from without inwards and from above downwards. Such a case as Dr. Bigelow's would be one of actual splitting of the cancelli from one another.

As to the mechanism of these fractures, a few words may here be said. Voillemier, whose excellent memoir should be read by every one who would render himself thoroughly acquainted with the subject, takes the ground that these injuries belong, for the most part, to what he calls "fractures by penetration"—the comparatively slender tube formed by the shaft of the bone being driven into the more expanded portion of cancellous structure which makes up the lower extremity of it. In other cases he thinks that the latter is torn off—this being the case in epiphyseal separations.

R. W. Smith objects to the "penetration" theory, on the ground that if it were correct the mere disengagement of the fragments would, in the specimens examined by him, have given to the bone an undue length; whereas it is obvious that such a disengagement ought, on that theory, simply to restore it to its proper form. He thinks that the appearances which led to this supposition were due to the deposit of callus on the outside (the *provisional* callus of the older writers), in the angle formed by the two fragments.

Malgaigne seems to adopt Voillemier's view, while Dr.

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[1] Vol. iii., p. 194; Boston Medical and Surgical Journal, vol. lviii., p. 99.

Hamilton indorses that of Prof. Smith. But perhaps both are right; penetration occurring in some cases, while in others there is simply an angle between the fragments, which angle becomes filled up by callus during the process of union. Certain it is that fracture may take place close to the wrist joint, with mobility of the lower portion on the upper, and crepitus; while in other cases the fragments are so driven together that both these signs are either wanting or very indistinct. In some cases the position of the fragments is such, after union has taken place, as to preclude the idea of penetration; and the same may be said of oblique fractures, whether the obliquity be such as that exhibited in Fig. 1, or such as was theoretically described by Dr. Barton. On the other hand, some even of Prof. R. W. Smith's own cuts of specimens would seem, to me at least, to bear out Voillemier's theory. It will presently be seen how these views, if true, should influence our treatment.

Mention was made on a former page, in speaking of Voillemier's results, of fractures by avulsion (*arrachement*), an explanation which he would assign to all separations of the lower epiphysis of the radius. Now I would suggest that, in such cases, there is a *rationale* more in accordance with the common principles of mechanics, namely, that the force exerted on the bone is a true leverage, and not a tearing. When the powerful fibrous structures on the palmar aspect of the wrist are stretched to their utmost, they act on the corresponding wall of the radius, then on all the successive cancellous columns, and, finally, on the dorsal layer of compact structure, as on so many levers, which give way in the order just mentioned. Very probably, as the last yielding occurs, the weight of the body still acting, the posterior or dorsal wall of the upper fragment is by it driven in front of that of the lower, and thus forced into the cancellous structure of the latter, so as to constitute a true impaction or penetration.

But the more common cause of fracture close to the wrist would seem to be the driving upwards of the carpal bones against the end of the radius. The upper end and the shaft of this bone are borne downwards by the weight of the body acting through the humerus, when the "heel" of the hand is

suddenly arrested, and through the carpal bones the shock is transmitted to the articular face of the radius. Sometimes, as in the stellate fractures—of which Dupuytren would seem to have seen or suspected more than other surgeons—and as in the oblique fractures occasionally met with, as well as in the remarkable case of Dr. Bigelow, before alluded to, the articular face itself gives way, the columns of cancellous tissue are split apart, and no transverse fracture is produced. In a very large majority of cases, however, the lower end of the radius is fixed against the carpus, the whole bone is compressed lengthwise and yields at its weakest point. Now, about three-quarters of an inch or an inch above its lower articular face the axis of the radius changes its direction, so that the two forces acting on it above and below are resolved into their diagonal, which will run nearly or quite transversely. It is probable that in many instances, combined with this mode of production of the breakage, there is also the one mentioned, as described by Voillemier—the *arrachement* or avulsion by the stress brought upon the fibrous tissues. This, acting on the anterior wall of the bone, may perhaps complete the fracture begun posteriorly by the forces previously spoken of. In both cases, however, the bony fibres would yield to a leverage.

When, along with a transverse fracture a little above the joint, there is a separation of the lower fragment into two or more pieces, it is easy to see how this may be caused by the upper fragment, especially if it is serrated, acting as a wedge—a process obviously favored by the concavity of the articular face of the radius, and the convexity of the corresponding surface of the carpus.

How are we to account for the peculiar "silver-fork deformity" of these cases? Every surgeon knows that unless by the extremest care this, with the abduction of the hand, will be reproduced before the consolidation of the fracture has been effected, and sometimes it cannot be prevented by all our efforts. I cannot but think that, produced perhaps originally by the force which breaks the bone, the displacement is reproduced by the constant and powerful action of the flexor muscles, as well as by that of the muscles running across the outer margin of the carpus to act upon the thumb. The too

early removal of the apparatus will be surely followed by a return of the deformity, however completely this may have been overcome, as I have myself seen in more than one case.

As to the treatment of these fractures, a principle quoted by Voillemier from J. L. Petit seems to me to be especially applicable, although there is no injury of the kind in which it does not hold good. It is that the apparatus employed should imitate, as nearly as possible, the hands of the surgeon. When, as in some instances of impaction of the fragments, they cannot be restored to their normal relation to one another, the obviously proper course is merely to keep the part at rest. Where manipulation can only partially correct the displacement, the treatment must be such as to maintain the degree of such correction until union has been fully accomplished. If the form of the part can be accurately restored, we must aim at keeping it in perfect position until the callus has become entirely solid, and too firm to yield to the steady pull of the muscles tending to distort it.

Now, in reducing these fractures, we find that the forearm and hand are best placed in semi-pronation, the elbow flexed at a right angle, the hand drawn towards its ulnar side, and pressure made over the lower portion of the ulna, while counter-pressure is made over the lower fragment of the radius, so as to squeeze it into its normal place. By gentle manipulation of this kind, together with, in many cases, carrying the hand somewhat backwards into extension on the forearm, the surgeon can very generally overcome the deformity altogether.

Did time and space permit, it would be interesting to review the various forms of apparatus by which the great end of keeping up this corrected position has been sought. But systematic writers have gone over this ground very thoroughly, so that it only remains for me to examine the most recent of the plans proposed, and to offer a few practical hints.

So far as I can ascertain, the methods of treatment most in vogue among American surgeons are two: first, that of Barton, by means of two straight splints, a palmar and a dorsal, extending from the elbow to the ends of the fingers, with compresses so arranged as to press upon the abnormally salient points; and, secondly, that proposed by Bond, in 1852, by

means of the palmar splint known by his name. This splint, with its outline corresponding to that of the forearm and palm, its angle at the wrist adducting the hand, its block to be grasped by the fingers, and its leather strips backed along either margin, is probably familiar to most of those who will read these pages. Hamilton's plan is a combination of both these, being composed of two flat splints, the palmar being so bent at the wrist as to adduct the hand, while the dorsal one corresponds in length with the forearm. He also recommends making the splints of thin board, sewing them in a sack of muslin, stuffing this with cotton or curled hair so as to fit the part, and then applying them directly. In less skillful hands than his the arrangement of the stuffing would be very apt to be wrongly done, and might produce deformity instead of preventing it.

A form of apparatus known as Gordon's has been strongly advocated in the Irish medical journals within a year or two past, although it is difficult to see upon what principle good results can be expected from its use. It consists of two wooden splints, carved to suit the forearm, and secured by straps; over the end of the lower one, which reaches just to the wrist, the hand hangs in a state of pronation. Having never seen this plan tried, nor heard, except through published reports, any testimony in its favor, I feel that it would be hardly fair to condemn it; but it seems to me to be calculated to aggravate instead of to prevent the deformity so apt to follow the injuries in question.

Some surgeons, among them Cline and Sir Astley Cooper, have proposed to let the hand fall into abduction simply by leaving it to itself; others, as Huguier and Diday, and at one time Velpeau, have sought to employ powerful extension for the same end. But, says Malgaigne, it is not the hand which pushes the fragment up, but the fragment which is itself displaced, and allows the hand to be adducted. And so far as the value of powerful abduction goes, I think every practical surgeon will agree to this. The forcible extension and abduction of the hand will not correct the deformity altogether, although it may appear to do so; hence, we cannot look for more decided effects from the mere weight of the hand.

I do not myself believe that there is anything better in these cases than Bond's splint slightly modified from its form as originally proposed, and with or without the addition of a dorsal splint, according to the degree of projection backwards of the lower fragment. The apparatus should be carefully adapted to each individual case, padded with especial reference to the amount and character of the deformity to be overcome, and watched closely, so that if not in all respects efficient it may be altered.

As supplied by instrument makers and the carpenters who generally do such work, the palmar portion of this splint is apt to be too nearly straight. But some persons have naturally more of an angle at the ulnar side of the wrist than others. We can readily ascertain whether or not the angle is right in any case, by comparing the wrong side of the splint with the sound forearm and hand.

The block should be so shaped as to fill up with as much accuracy as possible the hollow of the hand. It must, therefore, be neither hemi-cylindrical, as it is too often made, nor hemispherical; but should be rounded at either end of its palmar side, while its other surface is left for the fingers to press evenly upon.

I attach much importance to the semiprone position of the forearm and hand in these cases, as preventing the twisting of the injured part, and would secure it in children or restless adults by adding an arm-part for the inner side of the upper arm, like that of the ordinary inside angular splint. The dorsal splint, when used, will aid in maintaining this position, if it extends as far as the posterior outline of the arm when the elbow is at a right angle.

Perhaps, however, the most important element of the treatment lies in the arrangment of the padding. My own custom is to use raw cotton for this purpose, changing it whenever it becomes soiled, hardened, or lumpy. The compresses may be best made of patent lint, folded and laid outside of the cotton. Old linen rags folded will answer if patent lint is not at hand. Very great care should always be taken to make these compresses of exactly the right thickness, and to lay them over the precise spots at which their effect is needed.

An evenly applied bandage, making just the requisite degree of pressure, is necessary to the maintenance of the splints and compresses in their place. And I think that if, as a rule, the apparatus now described were kept on for at least six weeks, we should have fewer cases of deformity after these fractures than at present. Often, indeed, I believe it might be retained, with a gradual lessening of the size of the compresses, for a much longer time, to the great advantage of the patient.

With this paper the present series concludes. I have sought to show that the displacement and consequent deformity in fractures is mainly, sometimes wholly, due to muscular action, which must be obviated by our treatment. I have also endeavored to explain the *rationale* of the production of certain fractures on known mechanical principles. And I have ventured to offer some suggestions as to the practical surgery of the fractures of the upper extremity. I may, perhaps, be allowed to say that these papers have been prepared for the press in hours snatched from other avocations, and to ask such indulgence for their defects as this fact may entitle me to claim.

One more remark may be properly made here. While I have argued mainly upon mechanical and anatomical facts, I am well aware of the equal weight of clinical experience. It has been very far from my purpose to set the former against the latter. Mechanical principles and anatomical facts must be borne out by skillful surgery, just as true religion and true science must confirm each other. Two truths can no more clash than two parallel lines can meet. But in the clinical study of fractures and dislocations there are certain liabilities to error, mainly in diagnosis, which do not exist in the dissecting room. Nothing is more certain than that the progress of surgery has always kept pace with the accuracy and intelligence of anatomical investigations.

On the Use of Convex and Concave Glasses in Asthenopia. By EDWARD G. LORING, M.D., Baltimore.

All asthenopic troubles were originally divided into two classes:

1. "Where the continued use of the eyes on near objects is physically impossible.

2. "Where it is optically impossible."

As the following remarks will be confined almost exclusively to the first division of the above classification, it will be more rational to produce at the outset a description of the disease itself before considering the therapeutic remedies proposed, a description[1] which has never been surpassed, and which will probably remain as true for all time as it is for the present day. The portrait will remain the same, however much its place on the catalogue may change.

"All work on near objects causes either pain or an extremely disagreeable sensation in the eyes; sometimes, too, redness, blinking with the eyelids, a disposition to close the eyes, etc., so that it becomes necessary to cease from work. The symptoms then generally diminish. Sometimes, they gradually assume a more permanent character, and then become very obstinate. Vision is of natural acuteness. The range of accommodation remains normal, even though the eyes be wearied and painful. Not infrequently a small amount of myopia is present. Convex glasses are of no use. I can give but unsatisfactory hypotheses as to the nature of the affection. Nor am I inclined to believe that hyperæsthesia of the retina lies at the bottom of it."

To which Donders subsequently added the following touches, and the portrait was complete:

"The pain occurs in the eyes themselves, the characteristic tension over the eyebrows being wanting; moreover, to the last moment, vision is acute, and it is only the pain which causes the work to be given up."

In regard to the nature of the above type of asthenopia, Dr. Dyer, in a paper[2] read before the American Ophthalmo-

[1] Donders, Archiv. für Ophthalm., Bd. 4, Abth. 1, S. 330.

[2] Trans. of American Ophthalmological Society, 1865, p. 28.

logical Society, entitled, "Asthenopia not connected with Hypermetropia," came to the following conclusions; that there was—

1. "Some disturbance of the relative accommodation.

2. "Some want of tone or power of the ciliary muscle for continued action.

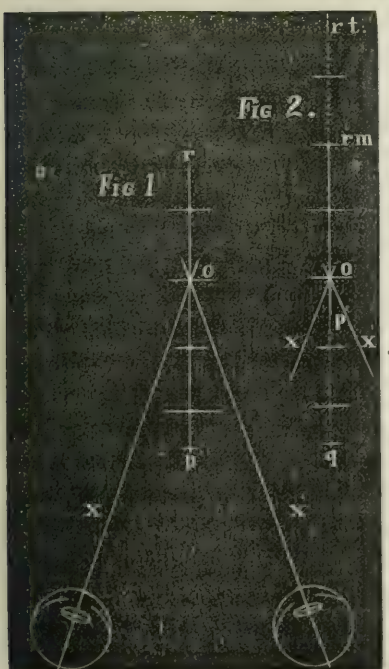
3. "Want of mental energy, the patient having lost confidence in his power to use his eyes."

In regard to the treatment to be adopted in such cases, Dr. Dyer proposed, first, to change the relation of the accommodation to the angle of convergence of the axes of the eyes by glasses. To the emmetrope he gives convex No. 30 or 36. With a myope of $\frac{1}{10}$ or less he simply corrects the myopia. In the higher grades of myopia he is satisfied with carrying out the far point to 10 or 15 inches. Having thus altered the relative accommodation, Dr. Dyer then prescribes (combined with general treatment when necessary) daily exercise of the eye, invariably provided with the requisite glasses. The patient begins with from 3 to 15 minutes, according to the case, three times a day, at stated intervals, and gradually increases the length of each reading. He progresses thus till he is able to read from 60 to 70 minutes at each period, when the glasses may be gradually dispensed with.

It would be superfluous in me to enter more into detail in regard to a method which has been so fully laid down by its originator, but agreeing to a great extent with Dr. Dyer, both as to the nature and the seat of the disease, and having become thoroughly convinced, in many cases, of the efficacy of the treatment proposed, I have been led to look into the matter for the purpose of explaining, if possible, the manner in which this benefit is effected—for no matter how entirely we may be convinced of the salutary effects of any therapeutic agent, it always becomes more satisfactory and more certain when we understand the way in which it acts. In order to do this we must first take into consideration the nature of the part to which the remedy is to be applied, and as this is, in the present case, what is known as the relative accommodation, it is to this that our attention will be chiefly confined.

In emmetropic or normal eyes there is a certain relation

between the accommodation and convergence of the visual axes, so that a certain amount of the former corresponds to a given amount of the latter; for example, with parallel visual lines the eye is accommodated for infinity, but with a convergence to twelve inches for a distance of twelve inches. Now, though this amount of accommodation is definite, it is by no means absolute, as is proved by the fact that with a fixed degree of convergence the accommodation can be modified and yet distinct vision remain undisturbed. Donders proved this some time ago by the means of convex and concave glasses, and established the amount of accommodation for the different degrees of convergence from parallel visual lines, or infinity, to a distance of about two inches from the eye (72°). This he expressed by means of an admirable diagram, or scale, which is, however, more elaborate than is necessary for the present purpose. I have therefore applied his experiment to a diagram which represents the normal emmetropic eyes of a person of twenty-two years of age, with a convergence of the visual axes of 11° 21′—*i. e.*, to a distance of twelve inches from the eye. I have taken this single degree of convergence for its simplicity, and because with it we obtain a greater amount of relative accommodation than with any other, while at the same time it is the average distance at which the object is held for near work.



In this diagram (Fig. 1) the eyes are converged, then, upon an object at a distance of twelve inches from the eye, the visual axes being represented by x and x', the object viewed, situated at their point of intersection, is denoted by o, which, as the accommodation is adjusted for that dis-

tance, is seen with distinctness. Now the strongest convex glass, through which the object *o* still remains distinct, will show the amount which the accommodation can be relaxed at this definite amount of convergence; this may be represented by the space extending on the vertical line from *o* to *r*. On the other hand, the strongest concave glass through which *o* still remains distinct will show the amount of accommodation which can be brought forth by increased tension or muscular effort, and this may be represented by the distance from *o* to *p'*. The sum of the two will represent the whole amount or range of accommodation. This is called the relative accommodation, and is expressed by the distance from *r* to *p'*. If, therefore—as in this case—the strongest convex glass through which *o* is seen distinctly is $\frac{1}{14}$, while the strongest concave glass is $\frac{1}{9.5}$, the entire relative accommodation for this convergence will be equal to the sum of the two.

$$\frac{1}{14}+\frac{1}{9.5}=\frac{1}{6}.\left(\frac{1}{A}=\frac{1}{6}\right).$$

If, now, we draw parallel lines at a certain fixed distance from each other, and make the distance between the lines represent a certain amount of A, say $\frac{1}{24}$, then the relative accommodation will extend over as many such spaces as the amount of one space is contained in that of the entire relative accommodation. As the negative part is equal to $\frac{1}{14}$, this will extend over many spaces as as $\frac{1}{24}$ is contained in $\frac{1}{14}=1\frac{2}{3}$; while the positive, being equal to $\frac{1}{9.5}$, will extend over $2\frac{1}{2}$ spaces. Consequently, the positive will be greater than the negative in the proportion of $2\frac{1}{2}$ to $1\frac{2}{3}$.

"*The distinction here made,*" says Donders,[1] "*already acquires practical importance from the fact that accommodation can only be maintained at a distance at which, in reference to the negative, the positive part of the relative range of accommodation is tolerably great.*" This is a most important law, and its practical effect is admirably shown in hypermetropia, as will be seen by

[1] Accommodation and Refraction of the Eye, p. 114.

a glance at Fig. 2, which represents a hypermetrope's eyes where the $Hm = \frac{1}{28}$, $Ht = \frac{1}{8}$, $A = \frac{1}{4}$, the degree of convergence and the distance of the object being exactly the same as in the preceding figure. It will be observed that in this diagram the negative portion of the relative A, or that situated between o and $r'm$, extends over two entire spaces, while the positive extends over a half of *one space* only (o to p'). Consequently the positive is to the negative only as one-half is two, or one-fourth as large. But if we now reckon in the amount of H which was latent (represented by the two spaces extending from $r'm$ to rt, and denoted in the diagram by the dotted line), the whole amount of the negative part will be equivalent to four spaces, while the positive, as before, will be equal to only one-half a space; or, in other words, the positive is to the negative as $\frac{1}{2}$ is to 4, or only *one-eighth* as large, while it ought to be almost twice as great. The disproportion between the positive part in the two cases is enormous, as will be seen at once in comparing the two figures, the exact deficiency in the hypermetropic eye being represented on the dotted line in Fig. 2, extending from p' to q. Now, as the positive part represents the amount of muscular force held in reserve in the eye, it will be observed also that Fig. 1, or the normal eye, is possessed of a very considerable quantity of this reserved muscular power, while Fig. 2, or the hypermetropic eye, has but a very small portion.

It will be seen, too, that although the positive part is here so much reduced, yet the entire amount of relative A is greater for this convergence for the hypermetropic eye than for the normal, that of the former being $\frac{1}{5.5}$, that of the latter $\frac{1}{6}$.

The reason, then, why the accommodation cannot be maintained for near objects in hypermetropic eyes, is not because the relative A, for a given convergence, is not sufficient, for it is usually greater than in normal eyes, but because the positive part is too small in proportion to the negative, or in extreme cases does not exist at all. In other words, the amount of muscular force expended is much greater than that held in reserve. But this may also occur, under certain conditions, in a normal eye; for as the convergence of the optical axes in-

creases, so does the amount of the positive decrease in reference to the negative, till the convergence reaches the nearest point of binocular vision, when it (the positive) no longer exists at all, the entire relative A being negative. The whole amount of muscular power held in reserve is demanded in order to adjust the accommodation for this point. Fig. 3 represents a normal eye thus converged to its nearest point for binocular vision, and here, as stated above, the positive part no longer exists. The relative A has thus become entirely negative, and is represented by the distance between o and r', while p' is coincident with o.

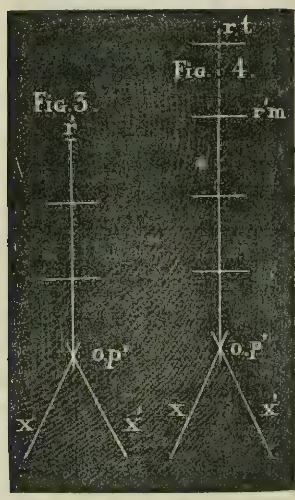


Fig. 4 represents the convergence of the hypermetropic eyes, taken before, to their nearest point of binocular vision, which is at nine inches from the eye. Here, too, the positive is entirely wanting, the relative A being completely negative. In both of the above cases the conditions are precisely the same,[1] the only difference being that the nearest point of binocular vision is, in one case four inches, while in the other it is nine. In neither, however, can the accommodation be long sustained, and the emmetropic or normal eye is just as much an asthenopic eye at four inches as the hypermetropic is at nine, and for the same reason, because the muscular force actually used is at the expense of that which should be held in reserve, and without which the A cannot be maintained. In fact, the hypermetropic eye is less asthenopic than the normal eye, for

[1] It may be objected that the conditions are not the same, since the convergence in the normal eye, being greater, the strain on the interni is also greater, and asthenopic symptoms would follow sooner on this account. Still, even if the interni are relieved by changing the convergence by means of prisms to nine inches, while the object still remains at four, even then the accommodation cannot be maintained at its maximum, and fatigue follows almost immediately.

the former by constant practice is enabled to maintain its accommodation at its maximum tension longer than the latter can.

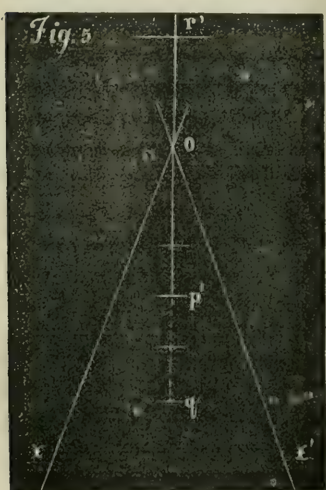
Having now considered the relative accommodation in the normal eye, we will pass to the morbid condition under consideration, viz., "Asthenopia unconnected with hypermetropia." There are two conditions under which this may occur: (1.) In emmetropia. (2.) In myopia. It is to the former that our attention will be directed for the present.

We have already stated our belief that the trouble in the majority of these cases was connected in some way with the relative *A*. The lesions of the accommodation take their origin from a morbid condition of the muscular apparatus presiding over this function. No matter how varied those morbid processes may be which lead to the disturbances, these latter are always dependent either, (1) On an abnormally exalted action of the ciliary muscle; (2) On an abnormally diminished action of the same. The phenomena due to the first are referable to spasm. Those due to the second are chiefly represented by weakness, which not infrequently shows itself after debilitating diseases, in which may also be included paralysis, either partial or complete, of the accommodation. It is only the latter which interests us here.

We have seen that in the hypermetropic eye the trouble was not so much that it could not accommodate for a near point, as that it could not maintain it at that point.

No muscle can long maintain its maximum tension without giving rise to fatigue and pain, and these follow, in the case of the ciliary muscle, just as they would in the case of any other muscle which was overtasked, and there is no reason why that which takes place in the hypermetropic eye from abnormal structure should not also occur in an emmetropic eye from weakness; that just as the ciliary muscle in the one case is overtasked from having an abnormally heavy burden to carry, so it might in the emmetropic eye be too weak to perform its normal amount of duty. But it has already been remarked that the range of accommodation in this peculiar kind of asthenopia is frequently normal, though it more often falls a little below this standard. How, then, can the ciliary muscle be weak or impaired, and yet the accommodation remain good?

This apparent contradiction can be easily explained, since it can be readily conceived that the ciliary muscle, though weak, may, under some incitement to great momentary exertion, be able, by bringing its whole amount of force into action, so to contract that the accommodation will be momentarily adjusted for some near point, while it would be impossible for it, in its debilitated state, to maintain for any length of time the tension requisite even for a point at which, in the normal eye, the accommodation is maintained almost indefinitely with ease. If, then, the weakened muscle is using a force disproportionate to its strength, in order to adjust the A for a given convergence, it must be at the expense of that amount of power usually held in reserve by the normal eye, and represented, as we have seen, by the positive part of the relative A. This will be readily seen from the following diagram, which represents the relative range of A for a convergence of twelve inches, in the eyes of an asthenopic patient of 23 years of age. In this case there was not a trace of hypermetropia, either manifest or latent, and there was no weakness of the interni. $\mathrm{A} = \frac{1}{5.5}$; $\mathrm{V} = 1$ (nearly).

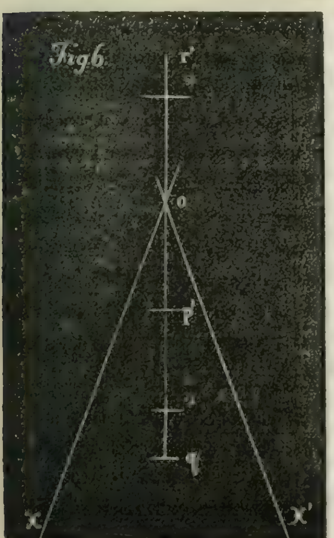


The greatest amount that the patient could relax his accommodation was equal to a convex No. $\frac{1}{14}$, so that the negative part of the relative A differed hardly from that in a normal eye. This is expressed in Fig. 5, by the distance on the line between o and r'. But the strongest concave glass which the patient could overcome was only $\frac{1}{16}$ (from o to p'); consequently the positive part will extend only over $1\frac{1}{2}$ spaces, while in the normal eye it extends over $2\frac{1}{2}$. Or, in other words, the positive is less than the negative, when it ought to be nearly twice as great. The exact deficiency of the positive is represented by the dotted line extending from p' to q, equal to one space $= \frac{1}{24}$.

As the accommodation can only be maintained with ease when the positive in reference to the negative is tolerably great, and as the positive here is abnormally small, it ought to follow that sooner or later the symptoms of asthenopia would be manifested, and this was the case. The patient could read from twenty minutes to half an hour, when uneasiness and pain began to be experienced, and on one occasion, under temporary stimulus, the use of the eyes having been persisted in for more than two hours, the subsequent pain lasted for over two days.

Yet this patient could for a moment see a small object (fine print) at six inches, making therefore the range of $A = \frac{1}{6}$, while continued exertion at 12 inches gave rise to asthenopic symptoms and sensations. The greater the debility, the greater will be the disproportion between the work to be performed and the ability to perform it, and the quicker will the symptoms follow, though the length of time during which the A can be maintained is, as is well known, very much influenced by the stimulus or excitement under which the work is to be done; but however great this may be, the trouble will be sure to follow in the end.

The same phenomena mentioned as occurring with the muscular system of the accommodation are observable in any other muscle of the body. The power which a muscle has of contracting a certain amount, and the power to maintain this contraction, are, though similar, distinct forces, and the former may exist without the latter. A partially paralyzed limb can be raised or extended with force for a moment, when it will fall supine, a single spasmodic contraction having exhausted its strength. Just so the eye can be accommodated a moment for the near point, but the contraction of the muscle cannot be maintained, and permanent tension becomes impossible.



(The line p' to q should be dotted its whole length.)

I have seen many cases of this type of asthenopia, where this deficiency of the positive, or want of reserved muscular force, was quite apparent. The amount has usually varied between what would be represented by a convex glass of $\frac{1}{20}$ to $\frac{1}{40}$. In two cases (of which Fig. 6 is one), I have seen the positive part only equal to $\frac{1}{30}$, the deficiency being consequently about $\frac{1}{15}$. In this case the patient was thirty years of age; there was not the slightest H, either manifest or latent; $V=1$, $A=\frac{1}{6}$ (nearly), which, however, could not be maintained at twelve inches for more than one or two minutes. It will be observed, also, that the negative here is less than it should be, the whole relative A being only half of what it should be for this convergence $\left(\frac{1}{A}=\frac{1}{18}+\frac{1}{30}=\frac{1}{11.25}\right)$.

Now in regard to the treatment of these cases. As it has been proved that A cannot be maintained for any length of time where the positive is not tolerably great in reference to the negative, and as it has been shown that the positive in the above cases is disproportionately small, the indication would appear to be to restore the positive to its normal dimensions, and it would follow that the asthenopic trouble would then be relieved. The question then is, how can this be done? The answer is, by means of convex glasses. Take the example represented in Fig. 5. Here the deficiency of the positive is represented by the distance on the dotted line from p' to q, equal to one space $=\frac{1}{24}$. If, now, we add a convex $\frac{1}{24}$, the deficiency is made good, and p' is brought to q, and the positive part made equal to that of a normal eye. As a convex lens represents so much muscular force, we have, by adding this lens, added just so much power. But we cannot thus alter the positive without affecting somewhat the negative, and in bringing down p' to q we have also brought down (at first almost to an equal degree) r', so that the negative becomes smaller. We have, in fact, not altered the amount of the relative A, but changed its *region*, and thus made the positive tolerably great in reference to the negative. The reason why the negative is more affected at first by the glasses than later, is, that an eye which has become accustomed to use a certain amount of strength, with a given degree of convergence, prefers to lay out that amount of

force, especially if the action of the muscle is strained or spasmodic. The muscle rejects at first the proffered assistance, which it is only willing to accept gradually. But the eye soon becomes accustomed to the glasses, and then allows them to take the place of the muscular effort formerly employed. Fig. 6 offers a good example of this. Here the deficiency in the positive is equal to a $\frac{1}{15}$, and it would at first sight appear rational to supply entirely this deficiency by adding $\frac{1}{15}$. If we did this we should, indeed, bring the positive to the normal, and p' would descend to q, but at the same time r', which is only equal to $\frac{1}{18}$, would be brought below the object o, or below the visual lines; that is, the eye would be accommodated for a point nearer than that for which it was converged, consequently the convergence must be increased to make vision clear; but as the amount of A increases with the act of convergence, the object will be brought nearer and nearer to the eye, till the strain on the interni is so great that muscular asthenopia will be the result. It is on this account that some practitioners have maintained that "by putting convex glasses on an emmetropic eye, we but substitute one evil for another." We deny this, and have endeavored, by the foregoing remarks, to show that the two things are not incompatible. It is true that in giving our assistance to one part we must not do this at the expense of another. In giving our crutch, we must take care not to lift the patient off his legs entirely, and so cause the whole weight to come on his arms. So, too, we must not relieve the A at the expense of the interni. But in the above case, if instead of giving $+\frac{1}{15}$ we give $+\frac{1}{30}$, we double the positive, and allow the patient to relax his muscle to that amount. When he has become accustomed to this, we could add another $\frac{1}{30}$, and so gradually change the region of the relative A, and allow the ciliary muscle to relax its tension, which would then be represented by the glasses.

It would seem to follow from the above that as soon as the want in the positive was supplied by the glasses, that the asthenopic symptoms would rapidly disappear. This is indeed so with a great many cases, and would be with nearly all, if a new factor of the disease did not come into play. As before stated, it is one thing for a muscle to contract and quite

another for it to maintain this contraction, and the fatigue which arises in this case is not that which proceeds from want of actual energy, as of lifting a load, but that which results rather from the simple extension of an elastic muscle while in the condition of contraction. The power to maintain a certain amount of contraction is to a very great extent dependent on the will, and mental energy here plays a most important part; "want of mental energy, the patient having lost confidence in his power to use his eyes," being a very prominent feature with the majority of the more marked forms of asthenopia. Of all hypochondriacs the asthenopic hypochondriac is the most miserable and the most troublesome. It is with the greatest difficulty that confidence—that plant of proverbially slow growth—takes root at all amongst them; and if it ever does it is easily uprooted again. It is very easy to give them the arms, but it is very hard to instill into them the courage and patience to use them. The best method to effect this seems to me that proposed by Dr. Dyer, viz., gradually increasing exercise at stated intervals during the day, with a light convex glass. The mere fact that they must use their eyes gives them the power to do so. The fact, too, that they must only use them at stated intervals, and never without the glasses, gives a regularity to the treatment which has a very important influence on the cure. It furnishes the patient with a regular occupation, no matter how slight it may be, and they perform with pleasure their allotted tasks; while the gentleness with which they proceed, which to a great degree prevents relapses, instills into them by degrees that confidence in their ability to work which is so absolutely essential for the easy performance of all labor.

I am aware that convex glasses were employed long ago in asthenopia by Böhm, Tyrrell and Ruete, and that the favorable results alleged to have been obtained by these practitioners were, after the discovery of hypermetropia, either doubted or attributed to the correction of the faulty refraction. But the manner in which the glasses were employed was entirely different from the one under consideration. They began with strong and passed gradually to weak. It was the actual muscular energy that they sought to supply, not the gradual cultivation of the ability of the muscle to maintain its tension.

Dr. Dyer has asked the question, in behalf of his method, "Why should not the ciliary muscle be strengthened by regular exercise, as well as any other muscle?" A prior question to this would seem to be, is the ciliary muscle, like all other muscles, ever fatigued by too much exercise? Common sense, as well as the verdict of all sedentary and literary people, would seem to affirm that it undoubtedly is, while modern writers on ophthalmology would appear to deny this fact, and to maintain that a normal emmetropic eye can be adjusted for the near almost indefinitely, while the slightest error in refraction may cause any amount of pain and inconvenience. If the question whether the ciliary muscle can be fatigued or overstrained be answered the affirmative, the other follows as a matter of course. Now, the best way to treat a sudden strain or sprain is by absolute and long continued rest, in order to let the muscle regain its tone; but if a person insists on using a sprained or strained limb in its weakened condition, and so exhausts it at every attempt, the strain becomes chronic, and the muscle loses its original vigor, which has to be brought up again by regular and continued exercise. So it is with the ciliary muscle. In many of these cases, if the trouble was taken at the outset, the eyes absolutely rested and the general health attended to, the asthenopic symptoms would pass away by themselves. But in the large majority of cases this is not the case—the strain becomes chronic, and then the difficulty is very hard to remedy, and rest alone does not seem to answer. And, moreover, at the best it is very hard to obtain absolute rest for the accommodation, even when insisted upon, since the eye is constantly changing its *A*, even when the patient imagines that he is resting it completely. Asthenopic patients often assert, with great force, that they have not used their eyes at all, and that they are condemned to perfect idleness, when by close questioning it is discovered that they have been in the habit of doing a good deal of work, but always with discom. fort and pain. They often read, however, without thought o time till pain begins to be felt, and then they imagine that this has been immediate. The only way to obtain this perfect rest is to paralyze the *A* and give suitable glasses. In aggravated cases this is often an excellent plan. It often enables the

patient to read at once for a long time, and so encourages them, while on the other hand it proves that the trouble lay in the ciliary muscle. But in the general run of cases this is by no means necessary, for by supplying a *weak* convex glass the A is allowed to relax, which is rest in itself, the exercise consisting in maintaining it there. These asthenopic troubles generally occur among those who are naturally weak and anæmic, or who have become so through some exhaustive disease. It is very true that persons in robust health sometimes present themselves who are suffering from asthenopia. But on close examination they can generally call to mind some attack of illness from which their general health had recovered perfectly, but after which their eyes had gradually begun to trouble them. With the majority, too, the "giving way" of the eyes has been sudden and oftentimes accompanied with acute pain, which, subsiding, leaves the eyes in a weakened condition.

This is very different from what takes place in asthenopia from hypermetropia, where the symptoms come on gradually, or are at first intermittent, to become constant at a later period. Then, again, where grave asthenopic symptoms are present, with slight degrees of H, this H is almost always manifest, and thorough paralysis by atropine, even in young children, fails to increase the amount of H, which is by no means the case where H is exclusively the cause of the asthenopia. The reason of this is probably that the H in these cases is so slight that the eye is, while its strength is normal, virtually emmetropic, and consequently accustomed to use a very minute quantity, if any, A, with parallel axes. But from this very fact, the moment that it becomes weak, the eye with parallel visual lines is both able and willing to relax the ciliary muscle to its utmost; while, on the contrary, being accustomed, with each convergence, to use more than the proportionate force, it not only cannot relax, but is compelled to overcome the amount of H.

Whether the above explanation *why* convex glasses are beneficial in many cases of asthenopia in emmetropic eyes be the true one or not, the fact that they are so is admitted by many authorities, both abroad and in this country, and it is quite as much with a view of calling to mind the result as of

explaining its cause, that the above remarks have been made, together with the hope that a method which has been so often successful in the hands of its originator, as well as in those of the present writer, may be tried and tested by other members of the profession.

Suture of the Flap, after Extraction of Cataract. By Henry W. Williams, M.D.

(Read before the American Ophthalmological Society, June, 1866.)

I offer for the consideration of the Society a few suggestions respecting suture of the cornea after the removal of cataract by a flap operation, in the hope that, by the adoption of such a modification of the ordinary procedure, we may so far lessen the risks of extraction that we shall not hereafter be tempted to incur the dangers attendant on the repeated introduction of instruments within the eye, and that mutilation of the iris may be rendered unnecessary.

My method consists in placing a single point of suture at the apex of the flap of the cornea, after extraction of the lens, and whilst the patient is still under the influence of ether.

After trial of various curved and straight needles, and of needles mounted upon a handle, I give the preference to straight needles of very minute size, less than a fourth of an inch in length, and with flat cutting points, as being best adapted to penetrate the corneal tissues. The objections to needles fixed upon a handle are, that it is difficult to disengage the extremely fine thread, and that in being withdrawn they drag upwards the corneal flap.

The great advantages claimed for this plan are as follows:

It renders etherization more applicable to extraction operations, as it obviates the danger of loss of vitreous after the operation, in case emesis should occur; and the patient being thus impassive, the operator is enabled to do, with deliberation and care, whatever may be requisite in removing complications which may arise in the course of an operation, without feeling that he incurs a risk of contusing the iris or losing a portion of the vitreous during sudden involuntary movements of the eye. The edges of the wound being retained in close apposi-

sition, union by primary adhesion, the first desideratum in flap operations, is rendered much more certain. The puffy, swollen state of the margin of the flap, which renders the healing process difficult and uncertain, is thus avoided, and the eye resumes at once almost its normal condition. It nearly obviates all risk of spontaneous prolapse of the iris—the "*bête noire*," to use the words of Mr. Dixon, "of extraction operations." By affecting a speedy re-establishment of the anterior chamber, it admits of the free use of atropia, without fear that *prolapsus iridis* may ensue, thus allowing continued dilatation of the pupil to be kept up, and lessening the risk of irritation of the iris from unremoved fragments of lens, or torn edges of capsule, or from proliferous degeneration of the intracapsular cells. It permits of early and frequent inspection of the eye, and the prompt discovery of any morbid phenomena, so that timely recourse may be had to appropriate remedies.

It much abbreviates the term of rigorous confinement of the patient, and shortens the entire period of convalescence.

A single strand of the finest silk is employed for the suture. The needle is seized with strong forceps and passed through the edges of the wound, which are held with very delicate toothed forceps. The eye being entirely passive, the requisite manœuvres may be executed with delicacy and without haste. Gentle compression, by means of lint and a flannel bandage, constitutes the after-treatment.

In most cases the suture has been left to come away of itself, and, though usually becoming detached within a few days, it has in some instances remained *in situ* for seven weeks, without giving rise to more than trivial irritation. I am satisfied, however, that its presence for a longer period than is necessary is undesirable, and serves slightly to retard the patient's recovery. My present practice is to administer ether and remove the suture within a week after the operation, if it has not sooner been eliminated. It is unsafe to attempt its removal except during anæsthesia, as a sudden movement of the globe, or the pressure of the forceps, if fixation be resorted to, might, as in one of my own cases, cause reopening of the wound.

In no instance, so far as I could judge, has the suture given rise to any serious symptoms. In twenty-four cases subjected to this treatment, there have only been two failures.

PROCEEDINGS OF SOCIETIES.

NEW YORK PATHOLOGICAL SOCIETY.

Stated Meeting, October 10, 1866.

Dr. W. B. Bibbins, Chairman *pro tem.*

(Continued from p. 294, January No.)

MELANOTIC CANCER OF LABIA MAJORA. DR. J. C. SMITH.

Dr. J. C. Smith presented a specimen, and recited the following history:

The patient is a woman forty-seven years of age, who is still menstruating regularly. She is very large and well developed, and is at present without any decided appearances of cachexia. Somewhere between two and three years ago she discovered, a little above the middle of the labium major of the right side, a small tumor, which increased in size, and as it increased became subject to a great deal of lancinating pain. This was soon attended with enlargement of the glands in both groins, and, after some little time, of suppuration of the glands in the left groin. The tumor was removed a year ago last January, and the wound healed readily in a few days. The other glands continued to enlarge; a little over a year ago another tumor appeared below the place where the first had been removed. This continuing gradually to increase, without giving her any special uneasiness, she presented herself at the N. E. Dispensary some four months ago, and requested the removal of the mass. Arrangements were at once made for the operation. She went home to menstruate, but did not appear again to let me know that she was ready until last week. She stated that at that menstrual period one of the enlarged glands had suppurated, and that she was too sick and lame in consequence to keep her promise. On Monday, in accordance with her urgent request, I removed the tumor. At the present time there is very little in the looks of the patient to indicate the grave nature of the disease. The cachectic appearance is very trifling indeed. It has been examined under the microscope by Dr. Lewis, and the following is the result:

Of the character of firm, circumscribed, medullary cancer, infiltrated with melanotic matter. Its microscopic constituents were elongated, caudate and rounded cells with free nuclei (both cells and nuclei varying very much in size), also a great amount of granular matter.

On section, there oozed from it a comparatively large amount of

very black fluid, containing the microscopic elements already mentioned. The stroma consisted of striæ of elongated cells arranged in a network including the round cells and nuclei in the interspaces. It contained a moderate amount of fibrous tissue. The cells were so densely filled with melanotic matter that it was in *most* instances impossible even to find the nuclei, and in *all* the nucleoli could not be distinguished. No fat globules were perceived.

CARIES OF FIRST DORSAL VERTEBRA—SPINAL MENINGITIS—RED SOFTENING OF THE CORD.

Dr. Jacobi exhibited a specimen of a spinal column and cord removed from a patient forty-six years of age. He first presented himself at the office of Dr. Jacobi about ten months ago, complaining of the usual symptoms accompanying emphysema of the lungs, constipation and frequent micturition. The patient was not seen again by the doctor until about a quarter of a year after, when he met Dr. Bauer in consultation upon his case. At that time the patient had been confined for five or six weeks. He had complained of frequent micturition, costiveness, a sensation of pain across the abdomen, and general debility. Very soon Dr. Bauer observed him to walk very like a patient with spinal disease; he would lift his legs very high and would put them down very unsteadily. After a while paraplegia set in, which, however, was not complete at the time Dr. Jacobi saw the patient. There was then only partial paralysis of the sphincter of the bladder and sphincter of the rectum; at the same time there was anæsthesia of the lower extremities, and pain on pressure over the last dorsal and the first or second lumbar vertebræ. There was no pain above this. Dr. Jacobi concluded that, as there was already paralysis of the sphincters, the seat of the disease was necessarily above the lumbar region; but he could not make up his mind as to any sensibility of the parts. The sensibility over the lumbar and lower dorsal vertebræ extending, say, over two or three vertebræ, was not very marked, so that the only diagnosis that could be arrived at was inflammation of the spine, without the dura-mater participating in the process. The patient was not again seen by the consulting physician; he lingered about four months, the symptoms becoming graver as far as the paraplegia went, and finally he died. In some measure, as his paraplegia increased, as the voluntary action of the muscles was diminished, reflex action was very marked, so that even at that time a simple touch would almost produce convulsive movements of the lower extremities. This lasted almost to his death. He

died with the symptoms of exhaustion, and, the last three or four weeks of life, with those of inflammation of the bladder, brought on undoubtedly by the paralysis.

The post mortem was made by Dr. Bauer. On opening the spinal canal it was found softened in the dorsal region, and thickened about twenty-five or thirty per cent. beyond the normal standard; at the same time the dura-mater of the spine in the neighborhood of the first and second dorsal vertebræ was immensely hypertrophied. This thickening was confined to the dura-mater only; it did not consist of a mere process of coagulated fibrine, but it was an increase of its substance, an hypertrophy of the connective tissue. The whole portion of the spine between the first dorsal and the fifth and sixth dorsal vertebræ was softened, increased in size, or rather in thickness, and had a peculiar reddish looking appearance; the disease was evidently red softening of the spine. In this thickened portion of the spine there was no possibility of distinguishing between the white and gray portions of the cord. The microscopical appearances revealed nothing else but the usual constituents of softening nervous tissue. No cells whatsoever of the nervous tissue could be distinguished—the whole mass being subject to fatty degeneration. The cause of this myelitis, extending as it did over the space of at least five vertebræ, was found in the condition of the first dorsal vertebra, which was almost entirely destroyed by caries. The disease evidently started in caries, after which spinal meningitis supervened, and lastly chronic softening took place. The remarkable feature of the case was the absence of the usual subjective and objective symptoms of myelitis. The only pain that the man complained of was situated at the twelfth dorsal and the upper one or two lumbar vertebræ—the last dorsal and upper lumbar being likewise sensitive to the touch. The respiratory symptoms were not sensibly aggravated, and there was very little tingling complained of in the paralyzed portions.

AORTIC ANEURISM OF UNUSUAL SIZE DEVELOPED FROM WITHIN THE PERICARDIUM.

Dr. Loomis exhibited a very interesting specimen of thoracic aneurism. It was removed from the body of a carman, thirty-seven years of age, who was admitted into Bellevue Hospital on the 18th of June, 1866. He stated, at the time he was admitted, that he had been a very hard drinker for the most of his life, that he had a venereal ulcer some ten years before, but gave no history of constitutional syphilis. In the summer of 1864 he was struck in the back by a bale of cotton

falling from a height. This injury confined him to his house for a few days, when he was enabled to resume his customary labor, although he stated that from that time he had never been well, and began to suffer from paroxysms of dyspnœa, yet he followed the occupation of carman without much inconvenience. In January, 1865, his dyspnœa became so severe that he was compelled to give up his work and enter St. Vincent's Hospital. Then, for the first time, he said that he experienced sharp lancinating pains in the left mammary region, striking through to the back. There was then no signs of a tumor. After remaining two months in that hospital, he thought himself so far recovered that he went to work again at his original occupation. In the following April he first noticed a small tumor in the right mammary region on a level with the third and fourth rib; the tumor was tender on pressure, otherwise it gave him little or no inconvenience. He continued his labor up to ten days before his admission to Bellevue Hospital, which was, as before stated, on the 18th of June.

At the time of his entrance, a large tumor occupied the right mammary region, presenting very much the appearance of an enlarged female breast. As you grasped the tumor it gave a dilating but not heaving impulse. There was no thrill. Over the surface of the tumor there were a number of dark spots, showing that the capillary circulation of the part was deficient. Percussion showed dullness over the whole of the right lung, more marked at the apex posteriorly than at the base. The apex of the heart was pushed out of its natural position to the left, beating beyond the left nipple. In the anterior portion of the chest in the infra-clavicular region there was dullness, and also dullness over the surface of the tumor. On auscultation, no bruit was heard, neither was there any murmur distinguishable over the heart or in the course of the arteries. There was absence of all respiratory murmur at the apex of the lung in front; posteriorly, loud bronchial respiration was heard over the middle and lower lobes. There was no change in the voice, no difficulty in swallowing, and no cough, at least none of an aneurismal character. The radial arteries were equally feeble. The pupils were equal in size and acted equally to light. The face on the right side was swollen and the eyelid was œdematous. The patient, when admitted, was unable to lie down with comfort and was compelled partially to sit up, leaning towards the right. He complained mostly of difficulty of breathing, and also of some pain. After his admission the tumor increased very rapidly, measuring twenty inches in circumference; the right side of the face

became more œdematous, and the right arm three times its natural size, but the radial artery was found to beat in the right arm. He lived on, suffering from difficulty of breathing, with little change in his physical signs. He died on the 12th of July.

A post mortem examination was made eighteen hours after death. The thorax and abdomen only were examined. The thoracic cavity was found occupied by an immense mass of something, which proved to be an aneurism springing from the origin of the aorta within the pericardium, pushing itself upwards and forwards, causing absorption of the second and third rib for four or five inches, and only involving the ascending portion of the aorta. The innominata was not involved. The calibre of the trachea was not diminished. The circumference of the tumor within the cavity was twenty inches. The heart was not hypertrophied, and there was no disease of the valves. The right lung was found consolidated over its whole extent. The left lung was in its normal condition, excepting at a point where the bronchial respiration was heard during life.

Dr. Loomis remarked that there were two points of interest connected with this specimen. One was that an aneurismal tumor of this size should be developed within the pericardium. He said that he had never seen any but small aneurisms in that situation, so great was the tendency for rupture to take place early. Another point of interest referred to the fact that the arteria innominata was not involved. The rule was, in all those aneurisms from the ascending aorta, that during their progress the innominata became involved.

The contents of the sac was formed of layers of fibrin, with clots which filled up its cavity almost entirely. No atheroma was discoverable in the neighborhood.

Dr. Jacobi was disposed to refer the cause of the aneurism to the injury received by the man upon his back.

Dr. Draper was of the opinion that the aneurism commenced outside the pericardial sac, and, by expanding, drew up the sac over it. The pericardium seemed to him to spring from the wall of the tumor two and a half inches from its base.

Dr. Loomis could not reconcile this objection with the known law in reference to aneurisms, viz., that the dilatations travel away from the heart instead of towards it.

PERFORATING ULCER OF THE ILEUM.

Dr. Draper exhibited a perforating ulcer of the ileum which was removed from a patient at St. Luke's Hospital, who died the day before

from relapsing typhoid fever. The patient was admitted about six weeks ago and had a mild attack of typhoid fever, from which he began to convalesce after two or three weeks. The convalescence went on until a fortnight ago, when relapse occurred. When Dr. D. went on duty, about a week ago, he found him suffering from the ordinary symptoms of relapse, and without much diarrhœa. His temperature did not rise above 102° Fahrenheit, and his pulse ran up to 110. He seemed to be progressing favorably, and recovery was of course anticipated. On Sunday night, however, the house physician was called to see him; he was in a severe chill and very much prostrated. His pulse was extremely rapid and feeble. No pain nor vomiting was complained of, but simply a feeling of great prostration and chilliness. Dr. D. found him, on Monday at noon, with an extremely feeble pulse; the face was pinched; there was no meteorism, no sickness of the stomach, no pain anywhere, and no marked tenderness on pressure over the abdomen. The doctor could hardly suppose from his condition that there had been perforation, but was rather inclined to ascribe his symptoms to pyæmia, from the fact more particularly that he had several abscesses developed on the back and buttocks.

As the result of the autopsic examination, the lower twelve inches of the ileum were presented. About eight inches from the colon a large perforating ulcer was discovered. There was also to be seen the commencement of recent ulcerations of agminated glands, which appeared to be loaded with typhoid matter. In regard to the ulcerations and the condition of the solitary glands the specimen was of peculiar interest, as proving that fresh ulcerations of the intestines may take place during a "relapse." Here and there over the surface of the intestine the remains of old ulcerations, which had healed, were to be seen. The point of clinical interest referred to the absence of symptoms of perforation.

Dr. Jacobi remarked that in some patients the symptoms of perforation were not marked; and

Dr. Bibbins illustrated the statement by the recital of a case occurring, as did Dr. Draper's, in the course of typhoid fever.

CASE OF URÆMIA, WITH ABSCESS OF BOTH KIDNEYS. BY DR. J. H. GRISCOM.

On the 11th September, 1866, I was called to a lady, æt. 39, the mother of several children, supposed to be laboring under some deflection of the uterus from its normal status. She complained of some of the uncertain and not clearly definable symptoms which are generally considered characteristic of uterine derangements, such as a

sense of pressure, irregularity of defecation, menstruation and micturition, and more particularly, as regards the latter function, a very marked deficiency of urine. An examination per vaginam failed to detect any uterine misplacement, but on introducing the sound an enlargement of the organ was at once detected, the instrument passing in about four inches beyond the os tincæ. There was also some irritability of stomach. From these general symptoms, none being very strongly marked, and the patient being herself convinced that her trouble was chiefly, if not wholly, uterine, the idea of their being derived from the sympathetic influences of that organ was almost necessarily confirmed. An investigation with Sim's speculum also revealed a state of engorgement, without ulceration. Assuming this to be the source of the symptoms, and there being no other local derangement complained of, resort was at once had to the depletory treatment by glycerine, applied by cotton tampons. This course was continued three or four days, in combination with diuretics, and such remedies as were indicated for the relief of the gastric irritation. Very soon, however, the alarming fact of still further diminution of urine was revealed, and which, *malgré* the use of every available means, in a few days reached the point of total suppression.

An important circumstance in the history of the patient was now first made known to me, viz., that about one year ago she had an attack of sickness accompanied with the same symptom—*i. e.*, an almost total suppression of urine, which was stated to have continued a week, but from which she recovered, and had, until the present attack, enjoyed good health. The cause of that suppression on that occasion was subsequently revealed.

Attention being now drawn to the kidneys, as the probable source of all the difficulty, especially as some slight evidences of uræmia began to manifest themselves in the nervous functions, such as physical and mental irritability, insomnia etc., though the pulse was almost uniformly normal, the probability of nephritis, or at least of congestion of the urinary organs, was apprehended, though the patient evinced, except the suppression, no strictly pathognomonic symptoms.

Cups, both dry and wet, were freely applied to the posterior nephritic region, and mercurial purgatives and alteratives with diaphoretics administered.

In a short time it was evident that the brain was becoming influenced by the ureal poison, by brief but marked convulsive movements of the head and upper extremities, partial loss of sight and slight coma. The cutaneous surface became dry and cold, which was re-

lieved, from time to time, by the application of the warm vapor of vinegar, and other means.

Occasionally about a drachm of urine would be voided, accompanied by a few drops of blood; but whether the latter was from the vagina or bladder was impossible to determine, especially as at the first of my attendance there was some slight uterine hemorrhage. The excessive and uniform irritability of stomach prevented almost wholly the retention of either food or medicine, which, of course, greatly interfered with treatment, helped to reduce the patient's condition and hasten the final issue.

During the last few days there was no discharge of urine at all, and it seeming possible that there might be retention, the catheter was introduced, and, to my surprise, there flowed through it from one to two ounces of pure pus alone, a specimen of which is herewith presented. For three or four days in succession the catheter yielded the same result, demonstrating the existence of a large abscess somewhere in connection with the bladder, and most probably in one or both kidneys.

The pathological specimens herewith presented demonstrate, not only the immediate cause of the suppression of urine, but also, as is believed, the circumstances which caused the attack a year before.

The two specimens differ somewhat in size. The larger, which is the left kidney, containing a well developed calculus, and two large abscesses, filled with pus, communicating with the bladder through the ureter, was evidently the seat of the last attack, and the cause of the suppression of urine, so far as it was concerned, is plain from the total disorganization of the whole structure.

The smaller specimen, though also containing a small abscess of apparently recent origin, was, doubtless, the principal seat of the previous attack, which idea is derived from the great amount of extraneous membranous deposit outside of the organ, doubtless the result of extensive inflammation, which must at the time have wholly arrested its function, with which its colleague sympathized, thus producing at the time total suppression.

The recovery of the right kidney from the attack, although unable afterward to perform its duty in any degree, in consequence of its disorganization, relieved the left one from its burden, and the secretion of urine by it sufficed to remove the urea until this last attack, when its disease prevented any secretion whatever, thereby causing the fatal result.

Stated Meeting, Nov. 14, 1866.

Dr. Frank H. Hamilton, President, in the Chair.

Dr. Post presented a steatomatous cyst, which he had removed the day before from the cleft of the nates of a woman, 39 years of age. It was attached to the posterior part of the cleft, its deep attachment being to the fibrous tissues covering the os coccygis. The specimen was only interesting in connection with its situation.

GENERAL TUBERCULOSIS—PERFORATION OF THE TRACHEA, ETC.

Dr. Lewis Smith exhibited a specimen which was removed post mortem from the body of an infant 18 months old. It died about three days before in one of the public institutions. This child had a protracted cough and was gradually wasting away. The respiration was moderately accelerated, and it was believed, from the symptoms, that the disease was tuberculous. There was nothing of any special interest in its history. We made no examination of the brain, as there had been no signs of any disease there. On opening the thoracic cavity, we found the lungs somewhat distended and filled with tubercles, which were for the most part very small, the size of a pin's head, together with some crude tubercles the size of a pea. There was no softening of tuberculous matter. The feature of interest, so far as the thoracic organs were concerned, was found in the air passages. There was general inflammation of the trachea and bronchial tubes, with slight ulcerations, and one large abrasion on the right side. This latter had perforated through one of the cartilaginous rings, and was the result of the presence of a degenerated bronchial gland loaded with crude tubercle.

The liver was found fatty, but not tuberculous. The spleen contained numerous tubercles, all of which seemed to be in a crude state. The mesenteric glands were nearly all tuberculous, the disease being more advanced in them than anywhere else. There were also tubercles found deposited in the peritoneal covering of the intestine, and corresponding to the situation of these deposits the mucous membrane was thickened and ulcerated. This is a matter of some interest, as showing that mucous inflammation existed as a result of deposit under the peritoneal coat, while there was no inflammation in the serous membrane itself. The point of greatest interest was the deposit of *crude* tubercle from the commencement.

Dr. Draper thought that they presented the appearance of ordinary miliary tubercle, and that the only fair test by which a decision could be arrived at was by a microscopic examination.

TUMOR OF THE EYE—PROBABLY (?) SYPHILITIC.

Dr. Noyes presented the left eye of a colored boy, sixteen years of age. In April last, according to his own account, which was very imperfect, he had some sort of inflammation, which he did not describe, and which continued for six weeks without any considerable impairment of vision and without pain. There was no discharge from the eye. Very rapidly at the end of that time the sight was lost and the organ became painful. In a very unintelligible way the patient endeavored to fix a period when a growth appeared upon the affected eye, but his statements were obviously unreliable; the appearance which the eye presented, when first seen by Dr. Noyes, was that of a tumor advancing from the left orbit, protruding between the eyelids, which, being unable to close over the mass, strangulated it somewhat at its base. It presented a protrusion larger than the end of the thumb, of a distinct red color, lobulated and smooth, and evidently covered with epithelium. There was nothing in it resembling a transparent cornea, neither was there any appearance of sclerotica. In the centre of the tumor was a convex surface corresponding in size to the general outline of the cornea. It, however, presented the same deep injection as the rest of the tumor. The growth evidently was one of the globe, as it moved easily with the eye. There being no granulations upon its surface it was difficult to decide as to its nature.

The boy stated that he had primary syphilis, followed by secondary, a year before; notwithstanding this fact, the diagnosis of syphilitic disease of the affected organ could not, with certainty, be made out. The eye was extirpated, and subjected to a very careful examination. There was total detachment of the retina, by effusion between it and the choroid. The crystalline lens has disappeared, and this tumor is found to penetrate to a certain distance in the interior of the globe. He then read the following result of a microscopical examination, made by Dr. F. Delafield.

The *retina* is detached and folded together in a funnel shape. It was too much altered by the glycerine to admit of microscopic examination.

Of the *optic nerve* there was no excavation. In the *sclerotic*, just behind its junction with the cornea, is an annular staphyloma. This staphylomatous protrusion was found to exist, in a greater or less degree, in all the sections made. It seems, therefore, probable that it embraced the entire circumference of the cornea.

The *corpus ciliare* is very much thickened. This thickening is due to a growth of small, round and spindle cells, and fibres through its whole thickness.

Growing from the corpus ciliare, and continuous with it, is a large mass, mostly white, in some places black, filling the anterior chamber and the staphyloma in contact with the cornea in front, and joined to the retina behind.

This mass varies in consistency in different places. At its origin from the ciliary body it is tolerably firm, and consists of fibres, spindle cells and small round cells. In other parts the growth is softer, the fibres are fewer; round cells and compounded granular corpuscles are found in abundance. In other parts the mass is broken down into fat and granules.

The *choroid* is thickened throughout, especially anteriorly. The thickening is due to an increase in the elements of the outer layer.

The *cornea* is in a condition of active cell-growth through its whole thickness, except the anterior elastic lamina and epithelium, which are unaltered. The change in the corneal tissue increases towards the posterior surface, where the posterior elastic lamina is destroyed, and nothing but a mass of round cells is seen. The posterior surface of the cornea and the new growth in the anterior chamber are in close contact, but can be easily separated.

The *conjunctiva* over the staphyloma and just behind it is much thickened, by an increase, not of the epithelium, but of the connective tissue beneath it.

Just behind the tumor and compressing it flatwise is a hard, red mass, consisting of fibres and a great number of shriveled blood corpuscles.

Although the elements of the tumor are all the same as those seen in simple inflammations of the tissues of the eye, yet the extent which the processes have reached, and the size of the new growth formed, seem to pass the limits of simple inflammatory changes.

As similar growths in the choroid are called choroiditis sarcomatosa, this may be called cyclitis sarcomatosa.

Dr. Draper was of the opinion, judging from the gross appearances and the history of the case, that the disease was, after all, syphilitic in character.

Stated Meeting, October 24, 1866.

Dr. Frank H. Hamilton, President, in the Chair.

NECROSIS OF THE FEMUR—SEQUESTRUM INVOLVING WHOLE LENGTH OF THE BONE.

Dr. Voss exhibited the lower part of the right femur of a boy

which had been removed by amputation that day, by Dr. Raphael, at the Jews' Hospital. The patient had, about two months ago, received a blow or injury on the lower part of his femur. Soon after an abscess formed, occupying the anterior and lower end of the bone. This abscess was evacuated by a very small opening, but the boy soon after began to suffer so severely from hectic fever that the operation of removal of his limb was necessary to save his life. The femur, after its removal, was sawn through longitudinally, and exhibited a beautiful sequestrum, involving nearly the whole of the shaft. At the line of amputation there was still at the upper end a small spot of necrotic bone visible. This was easily removed by the forceps.

OSTEO-MYELITIS OF THE FEMUR—AMPUTATION—DEATH ON THE TWENTIETH DAY.

Dr. Voss also presented a second specimen, which was the femur of the left side of a young man, twenty-six years of age, who had always been healthy, and who, having no hereditary taint, could give no assignable cause for his trouble. Dr. Voss saw him on the 29th of August, when the patient had been under treatment for about three days. He had then complained of a sudden pain in the lower part of his femur. This pain had commenced with rigor, which was followed by fever and great debility, while the lower part of his thigh was swollen and fluctuated. Two days after his first visit, and in consultation with another surgeon, he made an incision on the outer as well as inner aspect of the lower third of the limb. The whole shaft was then found denuded. The incision was followed by the escape of a large quantity of putrid matter, and was attended with a temporary abatement of the fever. Four days after the opening of the abscess his symptoms commenced to grow worse again, and on the 2d of September there was no doubt but that the joint had become involved. Amputation was consequently demanded and performed. The patient did well for a few days after the operation, when he was seized with rigors again, and sank with subsequent diarrhœa and exhaustion on the 22d, twenty days after the amputation. The examination of the femur, after its removal, showed it to be a case of osteo-myelitis. When the amputation was performed the lower epiphysis of the femur was movable, and was separated by granulations and pus from the shaft. The articular surface of the joint was entirely denuded of its cartilage and the osseous tissue was visible, and, as usual, was very thickly overlaid by thick, luxuriant granulation.

On making the post mortem examination afterwards it was found

that the pathological process was not only confined to the lower part of the femur, but that the inflammation of the bone extended as high up as the hip joint. This is a point of interest in connection with the assertion that in osteo-myelitis the inflammation always extends as far as the proximal joint of the bone affected, and for this reason disarticulation of the limb is preferred by many to amputation in continuity.

Dr. Hamilton remarked that cloacæ were always performed in one of two ways, either by death of the periosteum at a given point, and the consequent non-formation of involucrum, or by the actual absorption of bone and the subsequent ulceration of the periosteum. Dr. Voss's specimen illustrated the previous condition of things.

DILATATION OF THE AORTA FROM ATHEROMATOUS DEGENERATION—RUPTURE AND DEATH.

Dr. Buck presented the heart and large arteries attached which had been removed from a patient sixty-eight years of age. The aorta was found extensively diseased. In the first place it was dilated to more than double its normal dimensions, its internal surface being uneven, puckered and extensively deteriorated by atheromatous degeneration. At about an inch beyond the giving off of the left subclavian, and corresponding to the commencement of the descending portion, there was a remarkable contraction, with rounded form and defined edge, capable only of admitting the extremity of the little finger. This was evidently an old lesion. Immediately above and below this constriction the dilated condition of the artery already referred to commenced. The semi-lunar valves were stretched, but were normal. The exterior of the heart was surrounded with a large deposit of fat. At about the junction of the middle and lower portion of the thoracic aorta, a rent was discovered in the midst of extensively degenerated tissue, through which the hemorrhage causing death took place.

The patient was in affluent circumstances, and his habits and mode of life were of a very orderly, quiet sort. He was of a cheerful, buoyant disposition, and had rarely been a subject for medical advice. On the forenoon of the day he died he made an appointment with Dr. B. to have a tumor of his scalp removed. The next that was heard from the patient was a summons from his family about six o'clock. On arriving at the house immediately afterwards, the doctor found him already dead. The patient had taken his usual drive in the afternoon, and had returned home, taking his seat at the dinner-table, carved a fowl, suddenly complained of difficulty of breathing, and died in a very few minutes thereafter.

The wife stated that he would often, in walking back and forth in his yard, complain of want of breath, and the late Dr. Cheesman, who had been his physician, had evidently, in the advice given to him in reference to exercise, understood that there was some trouble about the heart. His wife remarked, too, that at night she sometimes could hear his heart beating when his head was pillowed.

The cavity of the thorax was alone examined. The left lung was found extensively adherent by old adhesions. The right cavity of the pleura contained at least two or three pints of coagulated and fluid blood. The tissues constituting the posterior mediastinum were found infiltrated with blood, and it was evident that the blood, after its escape from the artery, found its way into this situation, and afterwards ruptured its way into the pleural cavity.

ARREST OF DEVELOPMENT OF OVUM.

Dr. Reynolds exhibited a membranous envelope, the size of a turkey's egg, which was discharged per vaginam by a woman supposed to be two months advanced in pregnancy. The point of interest in the specimen was the presence of every thing in the mass to make it an undoubted product of conception, except the fœtus. The question then came up, what had become of the fœtus? The membranes were perfect in every seeming respect, but the contents of the sac were discolored and gelatinous.

Dr. Post remarked that he had met with just such a case. He had opened the membranous sac, but no fœtus was found in its interior.

Dr. Markoe had had a similar experience, and referred to a case in point which occurred with him during last summer. The ovum was about six weeks old, and after having been discharged was carefully examined (microscopically), and every thing but the fœtus was found to make it complete. He supposed that in such cases the fœtus died very early and was absorbed.

Dr. Gouley concurred in this opinion. He had dissected such specimens a number of times and failed to find the ovum. He related, in this connection, an instance of early arrest of development in the fœtus by the accidental twisting of the cord, the membranes continuing to grow afterwards until such time as the mass was discharged. He thought that the turbidity of the fluid in the sac was an indication of the absorption of the fœtus.

Dr. Peaslee had seen half a dozen of cases in which the fœtus was absent, but had never met an instance of an ovum which, under such circumstances, had reached a development beyond eight or nine weeks.

He did not think it possible for the membranes to be retained longer in a viable condition in the uterine cavity, as at that time the extensive connections of the chorion were withdrawn for the purpose of forming the placenta, and the membranes were in proportion deprived of that nourishment which they had before received.

NECROSIS OF FEMUR—RESECTION OF THE HEAD OF THE BONE—RECOVERY.

Dr. Hamilton presented the upper end of the femur which he had resected eleven days before. Eleven years before the patient had suffered from hip disease, and, as the result, his limb had become anchylosed. From that time until several months ago he experienced no special inconvenience. The awkward position of the limb, which was fixed at right angles with the body and adducted, did not interfere with his daily avocation, which was that of a tailor. About seven months ago a pain commenced in the thigh, and, in the course of five days succeeding, an opening was formed for the discharge of matter. He soon became an inmate of Bellevue Hospital. As the result of an examination with a probe, Dr. H., in common with Drs. Sands and Gouley, decided to make an explorative incision, in order to make a more correct diagnosis. On making the incision the outer surface of the bone was found roughened, and there was a cloaca on the outer aspect of the bone at the junction of the head with the neck. The opening in the bone was enlarged in the hope of finding a sequestrum, but none such could be discovered. The limb being firmly anchylosed, it was then decided to resect the head and get the extremity in a better position. The head of the bone, on removal, was found to *contain a sequestrum.* This circumstance, he thought, was not only remarkable in itself, but especially so in connection with a similar and equally remarkable case presented only at the last meeting by Prof. Post. The patient, since the operation, has done well.

The Society then adjourned.

Stated Meeting, November 28, 1866.

Dr. Frank H. Hamilton in the Chair.

MORBUS COXARIUS—NECROSIS OF FEMUR—RESECTION OF HEAD, FACE AND NECK OF THE BONE—RECOVERY.

Dr. Rogers exhibited the head and neck of the left femur of a boy eight years of age. Three years ago the patient began to complain of the ordinary symptoms of morbus coxarius, for which he was treated

by extension, falling in the mean time in the hands of various individuals. Next he entered the Institution for the Ruptured and Crippled, where he remained under treatment for the greater part of two years. The case came to the Demilt Dispensary a year ago this month. The boy at that time was very much emaciated, there being extensive suppuration from a row of sinuses extending in a longitudinal direction for half the distance down the external and posterior aspect of the thigh. He had hectic fever, night sweats, and his strength was failing so fast that it was not thought he would last very long. On consultation an operation for the removal of the diseased bone was considered advisable, and was performed by Dr. Rogers.

Not only was the head and neck of the bone removed, but a portion of the shaft, in an oblique direction, which had become denuded of periosteum by the track which the pus had taken to escape from the cavity of the joint. At the time the operation was performed there was scarcely any thing of the limb left but skin and bone, but by careful treatment the muscles acquired a considerable development, and the patient, being presented to the Society along with the specimen, gave ample evidence of being able to move the limb with considerable freedom. The operation had been performed only a year since, and the patient had been going to school for the past six months, and was able, with the help of a cane, to walk with ease. The affected limb was shortened about an inch. Slight rotation outwards and inwards had been preserved to him, and flexion was tolerably free, although, of course, limited.

Dr. Post called attention to the existence of a small sequestrum at the upper part of the shaft, just below the neck and on the inner side of the bone, which was no larger than robin's shot. He also remarked that there was a remarkable degree of porosity in the remnant of the neck.

Dr. Rogers, in answer to a question, remarked that the treatment subsequent to his operation was substantially the same as that for hip disease by extension. At the time that the patient was allowed to bear his weight upon the limb, aided by crutches, there was no difference in length between the two extremities, but as he began to use it the thigh bone shoved up a little. Dr. R. did not think that the difference would have been so great had his injunctions with reference to the gradual use of the limb been followed. Passive motion of the limb was early resorted to, and to this circumstance was doubtless due the amount of mobility already referred to. He stated that the sinuses on the back part of the thigh were serious obstacles to recovery,

and continued to exist long after the wound of the operation had granulated and healed.

Dr. Post thought that the specimen gave evidence of more absorption of the neck than the head.

Dr. Rogers remarked that the displacement of the capsular ligament, first described by Dr. Geo. K. Smith, of Brooklyn, as belonging to these cases, was found in the present instance.

GUNSHOT WOUND OF THE HEART—BALL EMBEDDED IN THE WALL OF THE RIGHT VENTRICLE FOR TWENTY YEARS—DEATH FROM PNEUMONIA.

Dr. Hamilton presented, on behalf of Dr. Balch, a heart, in the substance of which a rifle-ball had been embedded for twenty years of the life of the patient. The following is the history of the case, as furnished by the gentleman owning the specimen.

In the year 1840, John Kelley, a boy fourteen years of age, was employed at Chatham Four Corners, Columbia Co., N. Y., in driving a horse-cart hauling gravel for the construction of the railroad from Albany to Boston.

One night while in bed, in the upper part of a shanty, which was constructed for the workmen, a target rifle was fired from a hill back of the shanty; the bullet passed through two roof boards and a board partition, and entered Kelley's right shoulder through the upper border of the trapezius muscle, about two inches from the acromion process. The physicians who were called probed the wound, and thought they felt the ball about four inches from the point of entrance, the course of the ball being downwards and a little inwards. They decided to let the bullet remain, as they thought an operation was more dangerous than non-interference.

There was a little hemorrhage and no great local disturbance at the time. In about six weeks the boy was able to resume his work. He gradually gained his health, and to all appearances was perfectly well. He afterwards removed to Clinton Co., N. Y., married, and became the father of several children.

In 1845 he was attacked with pneumonia, situated in the upper lobe of the right lung. Dr. Orvill Terry, of Redford, Clinton Co., N. Y., attended him during this illness, and also his last. During the illness of 1845, for the first time, was noticed a very tumultuous action of the heart, which remained after his recovery from the pneumonia, and continued to increase up to the time of his death, June 14th, 1860, twenty years after being shot, and fifteen after disease of the heart manifested itself.

Kelley's last illness was the result of exposure to the cold waters of a mountain brook, he having gone into them, for the purpose of washing sheep, a few days before his death. Congestion of the right lung was the result of the exposure. The heart's action became exceedingly violent, and four or five days closed the scene. Two days before his death his right arm and hand became purple and cold.

The post mortem examination was commenced with the view of finding the bullet and of examining the diseased condition of the heart and lungs.

I dissected the neck; found the right internal jugular vein enlarged; the right external jugular I could not find; I found, however, something that I took to be the remains of the external jugular entering the internal jugular (which is an anomaly of that vein). In the right subclavian artery, pericardium and other places, I found atheromatous deposits. The upper lobe of the right lung I found congested; other parts of the lung normal; no tubercles any where. The heart was enlarged, soft and flabby, it having undergone Quain's fatty degeneration. The pericardium was very adherent, more particularly on the right side. I had not yet found the ball. A hard lump was felt in the right ventricle, near the apex of the heart. On introducing my finger into the ventricle, through the vena cava and right auricle, I ascertained that the lump was in the wall of the right ventricle near the septum, at the most pendent part of the ventricle. On looking carefully at the outer surface of the organ I could find no cicatrix. I then cut down upon the lump and found it to be a leaden bullet, somewhat flattened, and encysted in the wall of the heart.

Dr. Hamilton remarked that the case had been already published in the *American Journal of Medical Sciences*, but he was not aware that the specimen had ever been presented to any medical society. He stated, in this connection, that Dr. S. S. Purple, of this city, in a paper on wounds of the heart, published in the May number of 1855 of the *New York Medical Monthly*, reported twelve examples of gunshot wounds of this organ, in which the patients survived from two days to six years. In the case reported by Fugi the patient lived fourteen days with a ball in the pericardium. Dr. Hopkins, of Ohio, has reported a case in which the patient survived fifteen days with a pistol-ball in the wall of the left ventricle. Carnochan's patient, the notorious Poole, lived eleven days with a pistol-ball encysted in the walls of the heart. In the case reported by Dr. Randall, of Ohio, the patient died on the sixty-seventh day, and three shots were found in the right ventricle and in the right auricle, the wounds having cica-

trized. In the *Indian Annals of Medical Sciences* a man is said to have survived ten weeks with a musket-ball in the cavity of the left ventricle. Fournie records the history of a man who, wounded by a ball, fell as if he were dead. Three months after he suffered from severe palpitations, but which nearly disappeared after three years. He died six years after the receipt of the injury, from some malady unconnected with his injury, and the ball was found lodged in the right ventricle, near the tip, and resting on the septum medium.

Dr. Peaslee did not see why Dr. Balch's patient might not have lived much longer with the ball in his heart, as it did not seem that death was the direct result of its presence in that organ. The palpitation which the patient suffered was, in his opinion, probably increased by the extra labor thrown upon a heart already crippled. Beyond this increase of the heart's action to overcome the weight of the ball and the effect of its presence in somewhat embarrassing the action of the organ, there was nothing unusual. He observed that the missile in this instance had perforated the muscular wall, and was lying in contact with the attached surface of the endocardium.

Dr. Rogers thought that, inasmuch as there were no signs of a cicatrix upon the walls of the ventricle, the ball might have found its way to that situation by entering one of the large vessels, dropping down and passing through the endocardium.

Dr. Hamilton confessed that he had formed no theory upon the subject, but stated that he believed Dr. Balch was of the opinion that the missile had entered the heart from within.

Dr. Jacobi asked how such a circumstance as the wound of so large a vessel could be conceived without the occurrence of hemorrhage?

Dr. Hamilton, in this connection, referred to a case on record in which the carotid artery was wounded by a ball which plugged up the proximal side. The patient died of secondary hemorrhage from the distal extremity.

Dr. Post remarked that he had reported a somewhat similar case of wound of the vertebral artery, death taking place several days after from secondary hemorrhage. He also stated it as a well established fact that wounds of the large vessels near the heart were much more promptly fatal than similar wounds of the walls of the heart itself.

Dr. Flint was of the opinion that a ball of the size in the specimen presented would, if it entered the cavity of the ventricle, be driven by the current of blood into the pulmonary artery.

Dr. Peaslee suggested that, supposing the ball entered the heart from within, the only available vessel that could be wounded for such a purpose would be the superior vena cava.

Dr. Finnell stated that in Poole's case there was no sign of a cicatrix upon the external surface of the heart. A careful search was made for some track of a ball, but, none being found, the heart was placed aside and the examination continued. At length one of the gentlemen present, only by accident, discovered the ball in the substance of the heart.

Dr. Hamilton remarked that an interesting point in Dr. Balch's case was that no syncope followed the receipt of the injury to so vital an organ. In Poole's case the shock was so violent that his comrades at first thought him dead; so in the case of the man who survived six years.

SYPHILITIC NECROSIS OF SKULL.

Dr. Hamilton presented an example of syphilitic necrosis of the skull. The specimen consisted of the crown of the skull, and was made up principally of the upper portions of the two parietal bones. It was removed by operation on the Monday preceding. He exhibited the specimen more for the purpose of bringing out a point of some interest, which was, in effect, that the bone, although extensively necrosed and worm-eaten, was really not dead at the time of its removal. At the time of the operation he found this portion of bony tissue firmly adherent, by extensive granulations, to healthy parts beneath, the granulations extending into the very interior of the diploic tissue. When the bone was separated from these connections the hemorrhage was very profuse, so that in a very short time the patient lost nearly a pint of blood. He believed that the existence of these granulations explained the reason why the bone was absorbed; in fact, he considered that these vessels were the only agents by which absorption could be carried on.

The specimen also showed that the disease was confined to the periosteum. A considerable portion of bone, which, though dead, had not shown any signs of separating, still remained. The patient did well after the operation, and at the time of reporting the case was able to sit up.

PLEURISY, WITH PNEUMOTHORAX AND COLLAPSE OF LUNG.

Dr. Lewis Smith exhibited a specimen of pleursy in an infant. The patient died at the age of three months and fifteen days, without having any conspicuous symptoms, and without the usual courtesy of a diagnosis. On post mortem examination the left pleural cavity was nearly empty, the lung occupying only about one-sixth of the space allotted to it. This organ was firmly bound down by fibrous material,

which also covered the costal pleura. On attempting to inflate the lung, the air escaped through a small opening in the centre of a solidification in the upper lobe. This solidification was not due to pneumonia, but probably to pulmonary apoplexy.

The Society then adjourned.

REPORTS ON THE PROGRESS OF MEDICINE.

MATERIA MEDICA AND THERAPEUTICS.

1. *The Preservation of Sulphate of Iron.* (London Lancet, June 9, 1866.)

Signor Pavisi recommends the following method of preserving sulphate of iron from oxidation: Mix four parts of pure crystallized sulphate of iron, and an equal quantity of finely powdered gum arabic, with distilled water, and evaporate the solution in a water bath, at a low heat, till it has a sufficient consistency to be poured out on plates of glass. When it has been poured out in this way and allowed to dry at a temperature of 30° Cent. in the dark, it may be cut up into lozenges, which can be kept for any length of time in a colored stoppered bottle. A further account of this method is published in the *Tijdschrift voor Wettenschapplijke Pharm.*

2. *A Permanent Mass for Pilula Ferri Iodidi.* (The Medical Press & Circular, June 6, 1866.)

Iodide of iron being so unstable when exposed to air, Mr. Gross proposes the following form for a permanent pill-mass, which may be prepared extemporaneously:

Iodine	40 grains.
Reduced iron.	
Powdered acacia—ää	10 "
Powdered sugar	20 "
Glycerine	15 drops.
Powdered althæa	q. s.

To be made into 50 pills.

Triturate the iodine and the iron thoroughly together, dry, until they are reduced to a fine powder; then add the glycerine, and rub till the fumes of iodine cease to be given off, and the mixture assumes a greenish color. Then add the acacia and sugar, and, lastly, sufficient powdered althæa to bring to a pilular consistence.

The mass should be very stiff. When the pills are formed roll them in ferri pulv., and then coat them with tolu.

3. *Mercurial Collodion for the Removal of Syphilitic Patches of Discoloration.* (London Lancet, June 9, 1866.)

M. Leclerc states, in the *Presse Médicale Belge*, that a patient of his having tried, without effect, alkaline vapor and sea-baths for the removal of those

patches which appear on the skin in constitutional syphilis, he recommended her to apply the following lotion, which removed them in a few days: Corrosive sublimate, fifty centigrammes; collodion, fifteen grammes.

4. *A New Remedy in Gonorrhœa.* By J. S. Prettyman, M.D. (American Journal of Medical Sciences, July, 1866.)

In July, 1859, while narrowly observing the effects of oil of erigeron administered in a fearful hæmoptysis, I was led to suspect that it would prove a useful remedy in the treatment of gonorrhœa. Acting upon this presumption, I immediately commenced giving it to a patient then under my care, in whose case all the vaunted specifics had most signally failed. He improved at once and was speedily cured. Since that date I have prescribed it in about fifty cases, with unvarying success. It arrests the discharge in about 72 hours, and effects a cure in from six to eight days. I do not recommend it as a specific in all cases, but design merely to bring it to the notice of the profession as an exceedingly valuable medicine in this disease. Of course, all scientific medical practice is based upon the well known pathological condition of the structures involved, and this is our unerring guide. When in recent cases the urethral inflammation is severe, my plan is to precede the remedy with a full dose of some active hydragogue. A good formula is: ℞. Pulv. senna, ℈ij.; pulv. jalapa, ℈j.; pulv. aromaticus, gr. x. M. Add a gill of boiling water and a teaspoonful of sugar, and, when sufficiently cool, agitate and swallow at a dose. As soon as this operates, give ten drops of the oil on sugar, and three hours later a full dose of spts. æther. nit. in infus. althea, and so on every three hours alternately until the urethral irritation is allayed. Then leave off the latter and continue the oil until the cure is complete. If the case is not recent, or there is but little urethral irritation, the oil alone is sufficient.

I have used it also in combination with copaiba and other articles, and found such preparations to answer a good purpose, but no better than the oil alone.

The oil which I use is reputed to be that of the *Erigeron Canadense;* but I presume that from the *Philadelphicum* is equal, if not superior, for this purpose.

5. *Peru Balsam against Itch.* (Schmidt's Jahrbüch, 1865, p. 127.)

In the Berlin Charité, Peru balsam has been used against itch with great success. Dr. Burchardt's plan is to wash the patient thoroughly, morning and evening, and then rub in the balsam. By this means he has been successful in making a cure in several days. Under the microscope the itch insect in the balsam is seen to die in half an hour, and he thinks that the balsam, by penetrating the channels which the insect burrows in the skin, comes in contact with the germs and prevents their development.

6. *Iron in Renal Dropsy.* (Boston Medical & Surgical Journal, June 28, 1866.)

The preparations of iron in the pharmacopœia are numerous, but there is one which, in these cases of renal dropsy, stands pre-eminent for its efficacy, and should be preferred in these cases before all others. It is the tincture of

the sesquichloride. But it is not as a sesquichloride that its efficacy is most perceived in these cases. It is as an ammonio-chloride, kept in solution by acetic acid, that its beneficial influence becomes most apparent. It is a very simple preparation; a few drops of the tincture, according to the age of the patient, are added to a drachm of the liquor ammoniæ acetatis, previously acidulated with acetic acid.

If this be not done—if the sesquichloride is added to the neutral liquor—an insoluble ammonio-chloride falls, which is with difficulty again taken up; but if the saline is first acidulated, a beautiful sherry-red fluid is produced, which is neither unpalatable nor liable to decomposition, and may be kept any time. The tincture of the sesquichloride has long possessed the favorable opinion of physicians in most cases of renal or genito-vesical disorder.

7. *Lobelia in Asthma.* (Medical Times & Gazette.)

The *lobelia inflata*, a drug much praised and abused by quacks and somewhat slighted by the profession, is in constant use among the out-patients of the City Hospital, for diseases of the chest. In doses of ten minims, three times in the day, it appears frequently to produce the most admirable effects in cases of chronic bronchitis, complicated with a tendency to paroxysmal asthma. It is commonly given in conjunction with sedatives, expectorants, or stomachics, often agreeing remarkably well with the latter. Patients taking it frequently complain of much nausea and sense of depression during the half hour or so following each dose, but it seems on the whole to decidedly improve the appetite and digestion. If the nausea be excessive, combination with a few drops of dilute hydrocyanic acid is often useful.

8. *Mode of Administering Chloroform Internally.* (Richmond Medical Journal, June, 1866.)

The best vehicle for the administration of chloroform is milk. Those who have used it state that nothing more acceptable can be desired by either patient or physician.

9. *Aubergier's Syrup of Lactucarium.* (American Journal of Pharmacy, July, 1866.)

Dr. Wm. Procter, Jr., gives the following formula for the preparation of this syrup: Take of Lactucarium (German), half an ounce; sugar, granulated, an ounce; simple syrup, four and a half pints; citric acid, in powder, sixty grains; orange flower water, four fluid ounces; alcohol, water, each a sufficient quantity. Triturate the lactucarium with the sugar until it is reduced to powder; pour on dilated alcohol until the lactucarium is nearly exhausted, or until ten fluid ounces of percolate have passed; evaporate to two fluid ounces, and add it to the syrup, previously heated to boiling, and mix; continue the ebullition slowly until the whole measures four pints and six fluid ounces. Then add the citric acid and strain; and, lastly, when nearly cool, add the orange flower water, and mix them. Each fluid ounce contains the strength of three and a third grains of lactucarium.

10. *Curare in Epilepsy.* (Brit. Med. Journal, June 30, 1866.)

Dr. Benedikt informs the Vienna Medical Society that the subcutaneous

injection of curare has a favorable influence over epileptic diseases. A man 20 years of age had had epilepsy since he was 9 years old. During five months he was subjected to curare injections in hospital. For the last fifteen months he has had no return of the fits. Four similar cases, equally successful, were related by Dr. B. The injections were used three times a week under the skin in the neck, an eighth of a grain of commercial curare being used at each operation.

11. *Syrup of the Phosphates of Iron, Quinine and Strychnia.* (Medical Press & Circular, June 20, 1866.)

"Dr. Lyons has for some time past employed, with, he conceives, very important therapeutic results, this powerful tonic combination, for which the profession is mainly indebted to the late Dr. Eaton, Professor of Materia Medica in the University of Glasgow, and Professor Aitken of the Royal Victoria Hospital, Netley.

"This concentrated syrup of the phosphates is a perfectly clear and liquid fluid, slightly refracting light with the peculiar tint of the quinine solutions, and, viewed in mass, obliquely showing the bluish tint of the phosphate of iron held in solution. It is perfectly miscible with distilled water, has a strong styptic and distinctly chalybeate taste, and an aftertaste of quinine. It may be exhibited in doses of twenty to forty, and even sixty, minims, diluted with water, according to age and the circumstances of the case. It is well borne in the majority of cases; it acts as an invigorating stomachic, and sensibly improves appetite; it is an admirable general tonic; it appears to be a readily assimilable chalybeate, and is thus well adapted for certain chlorotic and anæmic states. In the morbid states of the nervous system which precede and accompany the development of the strumous diathesis, the influence of the strychnine salt appears to be exercised with great potency as a nervine, tonic and stimulant, and it would seem to be an important agent in altering the morbid state of the nervous apparatus which presides over the function of nutrient assimilation. Physiologically, this influence may be supposed to be attributable to the well known action of the strychnine salts on the spinal cord, as well as by direct stimulus to the filaments of the great sympathetic plexuses distributed to the stomach and intestines. From the general tonic and invigorating effect of this drug, its influence on the stomach and the promotion of appetite, as well as by the improved assimilation of food which it induces, it is a very valuable medicine in cases of strumous children threatened with scrofulous degeneration and ultimately with localized tubercular development. As a preparative to the use of cod-liver oil, and in certain cases as a concomitant to this food substitute, the syrup of the three phosphates will be found a very important adjunct in the treatment of numerous forms of strumous disease.

"But the employment of this admirable combination is not limited to the cases just mentioned. In depressed states of the system in the adult and aged, in several of the conditions tending to adipose degeneration of important organs, such as the heart and kidneys, the syrup of the phosphates will be found a serviceable and reliable remedy. Where it is desired to combine a tonic and styptic to aid in checking the drain of albumen from the system in chronic disease of the kidneys, this combination will be found of great use.

"In many forms of cutaneous diseases where a tonic effect is desired, this combination will be employed with benefit."

For the benefit of our readers we give the formula for the preparation of this valuable tonic, as obtained from the last edition of Dr. Aitken's "Practice of Medicine." The syrup (prepared by Neergard) is now in use in this city among many physicians, and is found to fully sustain the high commendation bestowed upon it by Drs. Aitken and Lyons.—[Ed. N. Y. M. J.]

"℞. Ferri sulph............................ ʒv.
Sodæ phosph............................ ℥j.
Quiniæ sulph............................ grs. cxcii.
Acid. sulph. dil............................ q. s.
Aquæ Ammoniæ............................ q. s.
Strychniæ............................ grs. vi.
Acid. phosph. dil............................ ℥xiv.
Sacchar. alb............................ ℥xiv.

"Dissolve the sulphate of iron in one oz. boiling water, and the phosphate of soda in two oz. boiling water. Mix the solutions, and wash the precipitated phosphate of iron till the washings are tasteless. With sufficient diluted sulphuric acid, dissolve the sulphate of quinia in two oz. water. Precipitate the quinia with ammonia water, and carefully wash it. Dissolve the phosphate of iron and the quinia thus obtained, as also the strychnia, in the diluted phosphoric acid; then add the sugar, and dissolve the whole, and mix without heat. The above syrup contains about one grain phosphate of iron, one grain phosphate of quinia, and one thirty-second of a grain of phosphate of strychnia in each drachm. The dose might therefore be a teaspoonful three times a day.

"The amount of phosphate of quinia might be increased according to circumstances; and if eight grains of strychnia were employed in place of six, as in the above, the phosphate of strychnia would be in the proportion of the one twenty-fourth of a grain in every fluid drachm of the syrup. I would scarcely venture on a much larger dose. In cases of delicate children, with pale countenances and deficient appetites, I have given, with great benefit, a combination of equal parts of the above syrup and of that prepared by Mr. Edward Parrish (of Philadelphia), often called Chemical Food. To children between two and five years of age, the dose of this combination may be a teaspoonful three times daily."

12. *Sulphuric Acid in Cholerine.* (Medical Press & Circular, June 20, 1866.)

"M. Worms states his conviction to the Academy that, under ordinary circumstances, cholerine may be certainly prevented from passing into cholera, by means of sulphuric acid, which, he says, he has exclusively used in three successive epidemics." This accords with the experience of Dr. MacCormac, of Belfast, as noted in our abstract of Materia Medica in the July number of the Journal.

13. *A Substitute for Ipecacuanha in the Treatment of Acute Dysentery.* (Lancet, July 7, 1866.)

In the Indian Medical Gazette for May, Mr. J. J. Durant, the civil assistant-surgeon at Shahabad, states that he has found the powder of an Indian

drug called *mudar*, an excellent substitute for ipecacuanha in the treatment of dysentery amongst the native population. In every acute case in which he prescribed mudar, it either effected a complete cure in a few days, or at once changed the character of the disease from bloody and mucous to bilious diarrhœa. He administers it in similar doses to what are usually given of ipecacuanha, never beginning with less than one scruple, and seldom going beyond one drachm. He usually gives it alone, but when a weak stomach is suspected in the patient he combines it with carbonate of soda, creosote, bismuth, prussic acid, etc. Like ipecacuanha, mudar, in large doses, is a reliable cholagogue; it is also a sedative to the muscular fibres of the intestines, particularly of the rectum and colon, rapidly allaying all pain, tenesmus, and irritation, and putting a stop to dysenteric action. Its most marked effect is the production of a copious flow of bile, which follows its use in about twenty-four hours. *Mudar* is the native name for *Calotropis gigantea*, a plant which grows abundantly in sandy waste places. The powder is prepared from the bark or rind of the root. It has a slight smell, and is of a lighter yellow color than ipecacuanha.

14. *Infusion of Senna with Coffee.* (Journal de Méd. et Chir. Pratiques, Juillet, 1866.)

It is often desirable to conceal the flavor of medicinal agents, and this can be readily effected with senna. The *France Médicale* and the *Journal de Médecine Mentale* supply us with a prescription which is used with much benefit in the asylums directed by Messrs. Moreau (de Tours) and Dumesuil (of Quatre-Mares,)

℞. Follicul. sennæ........................	ʒijss., ʒiv.
Pulv. Coffeæ Arabicæ.................	ʒij.
Aq. bullientis.........................	℥iijss.
Lactis..................................	℥iv.
Sacchari	ʒiss. M.

This mixture, a safe and pleasant aperient, causes no intestinal irritation, and, according to Mr. Lailler, is especially valuable, as its effects are not followed by constipation.

Taken alone, the decoction or infusion of senna leaves has a nauseous flavor which the coffee effectually corrects, and the addition of milk increases its laxative effects.

15. *Application of Collodion in Cholera.* (L'Union Médicale, July 26, 1866.)

Dr. Drouet, of La Grand-Montrougne, maintains that the external application of collodion will arrest the premonitory diarrhœa, and afford an excellent means of restoring warmth in confirmed cholera. He uses a mixture of collodion six parts, castor-oil one part, smeared on the abdomen, and covered with cotton wool. The evaporation of the ether at first causes a sensation of cold, but in the course of a few minutes this is followed by a feeling of warmth, which increases in intensity, without, however, becoming at any time so intense as to cause distress. The application, he says, will certainly arrest the progress of the disease if used during the first hours of the attack, and provided it be not of an extremely violent nature. Last year, Dr. Drouet cured seven cases of cholera where he was summoned within two hours after the

commencement of the attack, and he also cured more than fifty cases of choleraic diarrhœa.

16. *Formula for Donovan's Solution.* (Gazette Hebdomadaire, 3 Aout, 1866.)

The formula for Donovan's Solution has been modified in various ways, and it is, perhaps, in part due to this circumstance that we must attribute the want of uniformity in the results obtained by the use of this preparation. It is difficult to say to which one of these preparations we should give the preference, or by the aid of which one we can obtain the most satisfactory results. M. Pedrelli (Giornale Italiano delle Malattie Veneri et Bulletin de Therapeutique), physician to the Hospital of St. Ursula, at Bologne, recommends the following formula, which has in his hands produced most excellent results in various diseases of the skin (obstinate syphilides, lupus, etc.):

Iodide of arsenic, 20 centigrammes;
Distilled water, 120 grammes.

Dissolve in a glass vessel by the aid of heat, and add

Biniodide of mercury, 40 centigrammes;
Iodide of potassium, 3 or 4 grammes.

Filter and preserve in a well stoppered and colored glass bottle. The liquor thus obtained is clear, and has a light, pale tint. Four grammes of this preparation contain about six millegrammes of iodide of arsenic, and twelve of biniodide of mercury. The dose which he administers varies from four to one hundred drops, given in distilled water, three times daily. He increases the dose each day by one or two drops.

SUMMARY.—The following papers, although of special interest, are too lengthy to be transferred to our pages. We therefore present a summary only of the principal points of value in them. [ED.]

Bran Biscuits in Diabetes.

Dr. Arthur H. Hassal announces, in the *Lancet* of June 9, 1866, the entire unfitness as food for diabetic patients of the prepared bran and biscuits now sold. The method of freeing the bran from starch now in use consists simply in washing and pressing it. Inasmuch as the starch granules are chiefly contained in the cellular tissue of the bran, it is obvious that this process removes only a small proportion of the starch. This may be proved readily by adding a drop of tinct. iodinii to the bran or biscuit made therewith, when it will instantly become of a deep bluish black color. The amount of starch actually present may be ascertained by converting it, through the action of dilute sulphuric acid, into glucose or grape sugar, which may readily be washed away and measured. Analyses made on this plan furnished the following results: in one hundred parts of unprepared bran were found 45.65 of starch; prepared bran 44.50 per 100 parts; bran biscuits, 28.20 per 100 parts. These figures demonstrate the accuracy of the statement made above, and also serve to explain the frequent disappointment which is experienced in the use of these articles of food by diabetic patients. The method employed in the analyses furnishes a means of preparing this article of food in such a way that it shall be absolutely free from starch, and no difficulty is found in carrying out this process on a large scale.

In a subsequent communication to the *Lancet*, of June 30, Dr. Hassal suggests another process for ridding bran of its starch, by conversion of the starch into dextrine through the action of *diastase*. This method of purification is so easy and perfect that it leaves nothing further to be desired, and the results, so far as the color and composition of the bran are concerned, are certainly superior to those obtained by sulphuric acid. Dr. Hassal disclaims all intention of impugning the honesty of the manufacturers of the bran biscuits, and states that the radical fault is in the processes which they have adopted, and which they have been taught to believe were effectual.

Collodion. (Boston Medical & Surgical Journal, Aug. 9, 1866.)

Dr. John P. Maynard, who first introduced collodion as a dressing for wounds, gives the following as the formula best adapted for surgical purposes: Take two parts of sulph. acid, sp. gr. 1.850, and one part of nitrate acid, sp. gr. 1.450, mix them; allow the temperature to fall to about 100° Fahrenheit. Add to this raw cotton, to the point of saturation. Let it soak about one to two hours; pour off the acids; wash the cotton till litmus paper shows all acidity removed; dry thoroughly. The cotton will now be found to be converted into a gum, completely soluble in ether of about .750 sp. gr., or in pure ether 3 parts, and 95 per cent. alcohol, 1 part. Two ounces of cotton thus prepared will make about one pint of collodion of proper consistency for surgical purposes. This formula differs from that given in the United States Dispensatory, which Dr. Maynard repudiates as unauthorized and incorrect. Dr. Maynard also calls attention to a highly absurd application that has been made of collodion, by coating pills with it to conceal their taste. Collodion is absolutely insoluble in the gastric juice and intestinal secretions, and pills thus coated can have no more medicinal effect than so many shot.

Nitrate of Potash in the Cure of Intermittent Fever. (St. Louis Medical & Surgical Journal.)

Dr. Sawyer, of Illinois, states that he has used this salt with great success in the cure of intermittent fever, even where quinine has failed. He administers it in ten grain doses, with ℥ss. of brandy or water; or, if more agreeable to the patient, the powder may be placed on the tongue and allowed slowly to dissolve. He says: "I deem it a specific in ague, and have never failed to arrest the paroxysm, if uncomplicated. You will also find that the patients are less liable to relapse than when cured by quinine. In the cold stage, if administered in a full dose, and the patient be placed in bed and covered with blankets, he will in a few minutes experience considerable heat, which will be followed by copious perspiration, and every unpleasant feeling will vanish." The action of this medicine more closely resembles nature's mode of curing the disease in question than any other plan, as she cures by copious diaphoresis as well as diuresis; or, in other words, by elimination.

On the Therapeutic Effects of Gossypium as an Emenagogue and Parturifacient. (Atlanta Medical & Surgical Journal, October, 1866.)

Dr. Bellamy, of Columbus, Ga., states that during the late war, being cut off from the usual sources of supply of medicines, he, in common with other

practitioners at the South, was compelled to turn his attention to the investigation of the effects of the indigenous medicinal plants of that region. Among other agents thus subjected to experiment was the common cotton plant (*Gossypium*), it having been stated by Dr. Bouchelle, of Mississippi, in 1858, that the root of this plant was an emenagogue, and largely used by the slaves for the purpose of inducing abortion. Dr. B. then relates several cases wherein he used a fluid extract made from the root of this plant with marked success. His conclusions we give in his own words:

"I am fully satisfied, from the experiments and impartial trials I have given the remedy, that it is fully equal, if not superior, to ergot in promoting the various functions of the uterine organs. I look upon it as a sure, speedy and safe remedy, not only for difficult, painful, contracted labors, but also to control all the irregularities of females, and to alleviate their peculiar monthly sufferings. It is very certain that its effects are so powerful upon the uterine system as to produce miscarriage, if administered during pregnancy. I feel that its merits cannot be too highly extolled, and deem it too valuable a remedy to remain hidden in the depths of obscurity. I consider it preferable to ergot.

"The proper time to gather the root is when it is as old as possible without being injured by the severe frosts; therefore it is best when gathered during the months of October and November. If gathered before October, it is not sufficiently matured to possess its virtues to the fullest extent, and if taken later than November it is apt to be injured by the frost."

Capsicum in Delirium Tremens. (Medical Press & Circular, April 18, and June 20, 1866.)

Dr. Lyons urges the use of capsicum in from twenty to thirty grain doses in the invasive stages of delirium tremens. He administers it either in bolus or capsules. A simple dose sometimes produces profound and refreshing sleeps and thus cuts short the disease. Several cases are narrated, showing the beneficial efficacy of the drug when thus used. As capsicum belongs to the great order of the Solanaceæ, Dr. Lyons suggests the possibility of its containing a narcotic principle hitherto undiscovered.

The Mode of the Action of Strychnia. (Medical Times & Gazette, June 16, 1866.)

At a late meeting of the Medico-Chirurgical Society of Edinburgh, an important paper was read by Dr. Spence on this subject. From his experiments Dr. Spence arrives at the conclusion that in the spinal cord there is a distinct class of cells destitute of motor power, but possessing the property on the one hand of receiving impressions from the surface, and on the other of exciting the motor cells to action, and to this class of cells he refers the action of strychnia. Great misapprehension has existed in regard to the quantity of strychnia necessary to produce death in the cold-blooded animals, the amount being very generally underestimated, and very erroneous conclusions have therefore been made respecting the antidotal properties of woorari and nicotine in poisoning by strychnia. The therapeutical applications of strychnia formed the subject of the concluding portion of the paper, which was based upon a series of very ingenious and careful experiments, for which the author was awarded a gold medal by the Medical Faculty of the University.

Iodide of Iron in Tuberculosis. (Journal Prac. Med. & Surgery, March, 1866.)

Dr. Miller, of Tours, presents the results of his investigations and experience in tuberculosis in the following conclusions. His views are in accordance with the practice and teachings of Trousseau, and antagonistic to those of M. Louis, who almost invariably prescribed iodide of iron (Blancard's pills) in all chronic pulmonary disease.

1. That protoiodide of iron is not a specific remedy for tuberculosis.

2. That it occasionally gives rise to a state of plethora favorable to the production of pulmonary hemorrhage.

3. That this remedy is inappropriate for nervous and irritable or sanguineous constitutions, except as a restorative in the most advanced stages of tubercular disease, and is not even then preferable to any other chalybeate.

4. That consumptive subjects, residing in a dry, warm and stimulant climate, should refrain from the use of this remedial agent.

5. That lymphatic or scrofulous subjects, on the contrary, residing in a cold climate, will probably derive some benefit from its exhibition; trustworthy authors have even, in such cases, ventured to hope for a cure.

6. Practicing myself in a temperate climate, I have derived but slight advantage from the exhibition of protoiodide of iron in tuberculosis. In a few instances I have observed remarkable temporary improvement, but I do not feel justified in attributing it to the remedy.

7. In galloping consumption, and even in cases in which the progress of the disease is a little more rapid than usual, when feverishness is present, the drug cannot be resorted to without risk.

8. In strumous, torpid tuberculosis, unaccompanied by fever, iron may be serviceable as a general tonic and as a stimulant of the gastric functions.

9. In some cases the disease has appeared to me to receive an unfavorable impulse from the effects of chalybeates.

10. In young women, laboring under pseudo-chlorotic symptoms, iodide of iron should be prescribed with the greatest reserve.

VARIA.

The International Medical Congress of 1867.—In accordance with the intention announced in our November number, we lay before our readers a portion of the commentary of the committee of the proposed International Medical Congress. This commentary is sufficiently explicit, and we therefore give it without comment of our own, merely expressing the earnest wish that some of our American experimenters and investigators may contribute to the solution of these important questions, and in a manner that shall reflect credit, not only upon themselves, but the country which they represent.

First Question.—Pathological Anatomy and Physiology of Tuber-

cle. Of Tuberculization in different countries, and its influence on the general mortality.

It is but a few years since the anatomo-pathological history of the degeneration which it was found convenient to designate by the name *tubercle*, was supposed to be perfectly determined; the mode of development, anatomical seat and consequences of this lesion appeared well established.

Assertions more recently put forward, and which are far from being conformable with the views generally accepted, have, however, raised some doubts and originated some hesitancy regarding the pathological anatomy and physiology of tubercle. It would be desirable to know whether these well defined differences of opinion, obtaining among observers on this question, are due to certain dfferences arising from the circumstances under which the lesion is developed, or whether they are merely the results of the different interpretation of the same facts.

We ought, therefore, to inquire—

Whether there really exists a special or a *specific* growth which can be considered characteristic of tubercle?

What is the precise mode of formation of this pathological product?

Finally, whether it has an exclusive anatomical seat, localized and identical for every organ?

In these researches it is desirable that anatomical and histological demonstrations should take precedence of theoretical views and interpretations, and their personal impressions or speculative deductions should not be substituted for rigorous experiment and observation. We ought also to ascertain, as far as may be possible, the exact value and character of certain changes which many observers have considered of a tubercular nature, while others have regarded them as of true inflammatory origin. In other words, the question relates particularly to that kind of degeneration styled by some authors *caseous pneumonia.*

Is it really possible to inoculate tubercle in the manner of virulent diseases? This question, only lately raised, demands a solution, to which the labors solicited by the Congress may contribute.

As regards the second part of the question, we should endeavor to accurately define the etiological conditions which in different countries are considered to have an active and preponderating influence. The influence of age, sex and climate, that of different races, of social habits, of food and drink, of special avocations in places where observation has been made, and, finally, the influence exerted by previous or coincident diseases, will be the points to which especial attention should be directed.

In studying these different questions by the aid of the material of direct observation, which each one can arrange for himself, we shall certainly advance science more than by accumulating quotations and hypotheses pertaining to these various subjects.

The most common symptomatic appearances, in this or that locality, should be especially well pointed out, as well as the more frequent complications, and the influence which they exercise in hastening or retarding the growth of tubercle. It is equally desirable to study the influence which tuberculization exercises, in different countries, upon the development, symptoms and progress, and especially the termination of other diseases. This will at once be a means of learning "the influence of tuberculization upon the general mortality in different countries"—a question the importance of which cannot be overestimated, if we consider the ravages which this affection makes everywhere among peoples.

It is very important, and we cannot insist too strongly upon this point, that all papers prepared as a study upon these different questions should be as exact as possible. Every information, then, and above all, perhaps, official statistics, should be submitted to the most rigorous investigation before according to them the title of materials of positive value.

Second Question.—Of the common accidents which result in death after surgical operations.

In the face of the continuous progress in surgical therapeutics, the increasing perfection in operative procedures, the richness of our armamentarium, and the minute attention bestowed upon *régime* and the hygiene of the patient, death too often yet follows severe operations. This fatal termination is due to a great number of causes, which must be divided into classes.

Sometimes it must be attributed to error or accident, for which the operator himself is more or less responsible.

Sometimes it must be ascribed, not so much to the operative procedure as to the disease which necessitated it, to the complications which that disease has given rise to, or to the general causes which have engendered it.

These causes of death, of easy appreciation, the commission merely call attention to, but do not hesitate to exclude them from the limits of the proposed question. The attention of observers should rather be fixed upon a third class of accidents, whose etiology is less well understood.

An operation has been performed in an unexceptional manner. It

has not involved any organ essential to life; the natural processes of reparation, properly directed, kept within proper limits, yet freed from every hindrance, ought, without difficulty, to result in a certain cure. Yet we see accidents arising which cannot be referred either to the origin or to the nature of the wound, or to the neglect of any established rule.

These formidable complications are—to cite only the most common —diffuse inflammation, gangrene, erysipelas, angeioleucitis, phlebitis, pyæmia, tetanus, etc. These accidents, which occur at all times and in all countries, have been for a long time carefully studied. We fight against them, oftentimes with more courage than success, but the causes which preside over their development are still vailed in obscurity. It would seem, also, that they do not show themselves, at all times and in all places, under the same aspect or with the same frequency. Thus tetanus, which in hot countries often complicates the most insignificant wounds, is proportionally less common in our temperate latitudes. So also purulent infection, with phlebitis and metastatic abscesses, so accurately described by our classical authors, seems now, in our large hospitals, to have given place, as a cause of mortality, to severe erysipelas, and certain illy-defined forms of pyæmia.

Finally, also, some capital operations (ovariotomy, resections, amputations) give results so different in our country from those obtained across the British Channel, that we ought seriously to inquire whether our people and the English do not possess a totally different tolerance of wounds—an opinion which is strikingly borne out, at least in appearance, by the results recorded in the statistics of military surgery after the campaigns of France and the Crimea.

These data, still hypothetical—that is to say, assumed rather than demonstrated—the commission propose as problems worthy of solution. The nosography of the affections just enumerated being sufficiently advanced, it would be superfluous to enter into long descriptive details. The inquiry should rather be especially directed to the following points:

1st. Is the mortality after surgical operations equal in all countries, or does it vary according to race and climate?

2d. Do the general affections which determine it show themselves everywhere with the same relative frequency, and under the same pathological forms?

3d. In the cases where marked differences have been ascertained, and the influence of race and climate acknowledged, what part should

be attributed to regimen, to the modes of dressing [the wounds] and treatment, and to general hygiene, etc.?

The answers to these difficult and important questions should be based, not upon impressions or recollections, but, as far as is possible, upon statistical documents that are sufficiently explicit, and selected with all the exactness of cotemporary science.

From the Report of the Superintendent of Health of the city of Providence, R. I., we take the following statistics:

Year.	Population.	Deaths.	Deaths in population.
1864	53,810	1,281	1 to 42.01
1865	54,595	1,211	1 " 45.08
1866	56,000	1,036	1 " 54.05

Consumption accounts for very nearly one out of every five deaths, the figures for the three years being 197, 195, 201. Pneumonia comes as the next highest cause of mortality, the figures being, for the same years, 65, 74, 81. Scarlatina, which, in 1864, carried off 141 victims, in 1866 claims only three out of the total mortality. Cholera is credited with fourteen deaths in 1866, against none in the previous years.

At the Annual Meeting of the New York Medical Journal Association, holden on the 4th of November, the following officers were elected: President, Dr. Gurdon Buck; First Vice-President, Dr. Isaac E. Taylor; Second Vice-President, Dr. Stephen Smith; Recording Secretary, Dr. F. A. Burrall; Corresponding Secretary, E. Noeggerath; Treasurer, Dr. S. T. Hubbard; Trustees, Drs. E. Delafield, W. Blakeman, H. D. Bulkley, J. L. Banks, D. C. Enos, Alfred Underhill and A. B. Mott.

Dr. T. Edwards Clark, Professor of Chemistry in William's College for some years past, has resigned his position in that institution, and located in this city in the practice of medicine.

Deaths and Suicides in Vienna during 1865.—According to the Report of the Vienna Stadtphysiker, or Sanitary Officer, it appears that in 1865 there were registered 21,128 deaths. The following were the chief causes of death: phthisis pulmonalis, 4,842; pneumonia and pleurisy, 1,315; typhus, 795; croup, 411; brain diseases, 380; apoplexy, 202; heart diseases, 310; measles, 152; scarlatina, 94; pertussis, 103; variola, 137. There were registered 109 (85 males and 24 females) suicides, though these really were supposed to amount to between 120 and 130, as some of the "found dead" were really suicides. Of the 109 deaths, 26 (15 males and 11 females) were

caused by poison, 7 (5 males and 2 females) by falls, 14 (all males) by firearms, 7 (6 males and 1 female) by wounds, 3 (all males) by the fumes of charcoal, 6 (5 males and 1 female) by drowning, and 46 (37 males and 9 females) by hanging. Thus, hanging was the commonest means of suicide, being especially affected by laborers and mechanics, while officials, merchants and students gave the preference to poison or firearms. It is worthy of observation that while the number of women who hanged themselves was exceeded by that of those who took poison, the number of men who poisoned themselves was not half so great as that of those who chose hanging as the means of death. Poisoning by cyanide of potassium occurred in twelve instances, death usually taking place in a few minutes. Mineral acids were taken in eight cases, death occurring in from two to twenty-four hours.

The Paris Faculty of Medicine.—This body has decided to recommend, for filling the vacant chairs, the following gentlemen: *Therapeutics:* 1. M. Sèe; 2. M. Hardy; 3. M. Gubler. *General Pathology:* 1. M. Lasègue; 2. M. Chauffard. *Pathological Anatomy:* 1. M. Vulpian; 2. M. Laboulbéne; 3. M. Empis.

Ovariotomy in Paris.—Two operations have been performed recently—one by MM. Gosselin and Labbé in the vicinity of Paris, and the other by M. Maisonneuve at the Hôtel-Dieu. Thus far both cases have done well, the one having been operated upon on the 27th, and the other the 30th of November. In M. Maisonneuve's case the lower half of the wound was left open to facilitate the egress of discharges.

Medical Colleges on the Pacific Coast.—The Willamette University, at Salem, Oregon, has just established a medical department, with a full corps of eight professors. This is the second medical college established on the Pacific coast. The other (the Toland Medical College) is located at San Francisco, and at the recent commencement the degree of Doctor of Medicine was conferred on ten graduates.

A Useful Hint.—In Vienna the use of sulphate of iron as a deodorizer has had a most beneficial result. According to *La Presse*, the rats have been so effectually destroyed by the use of green vitriol that recently Professor Hyrtl was unable to procure a supply of these animals for experimental purposes. There is no better or cheaper substance known as a deodorizer, and if it results in the wholesale destruction of these pests we would advise its use freely.

Death from Fright.—Dr. Cazenave, of Bordeaux, gives, in the *Gazette des Hôpitaux,* a case of death of a man suffering from calculus, through fright immediately before the operation of lithotomy. The patient was a well known veterinary surgeon, aged sixty years, once a very hale and energetic man. Lithotrity had failed to relieve him; resort was therefore had to lithotomy. The patient was bandaged up for the operation, and the operator was on the point of introducing the catheter into the bladder, when the patient suddenly became pale and pulseless, and, spite of all attempts to recover him, was dead in ten minutes.

The Psychological Phenomena of Anæsthesia.—Among the prize questions of the French Academy will be observed the following: "The Psychological Phenomena before, during and after Induced Anæsthesia." On this subject a very interesting essay might be written, not omitting some remarkable modern trials—for one of the psychological phenomena subsequent to induced anæsthesia seems to be a strong tendency to prosecute the doctor.

Academy of Medicine.—M. Tardieu has succeeded to the Presidency of the Imperial Academy of Medicine, and M. Ricord has been elected Vice-President.

Charm for Hydrophobia.—The *Pall Mall Gazette* lately gave an extraordinary example of the tenacity with which the uneducated cling to old superstitions. At an inquest held lately at Bradwell, Bucks, on the body of a child, aged five, who died of hydrophobia, Sarah Mackness stated that at the request of the mother she had fished the body of the dog by which the child had been bitten out of the river, and had extracted its liver, a slice of which she had frizzled before the fire, and had then given it to the child to be eaten with some bread. The dog had been drowned nine days before. The child ate the liver greedily, drank some tea afterwards, and died in spite of this strange specific.

Army Medical Affairs.—Assistant-Surgeons and Brevet-Majors Peter V. Schenck and Charles S. Wilson have resigned, to date from January 1st, 1867.

Assistant-Surgeon and Brevet-Major Thomas G. Mackenzie died suddenly in Washington, January 1st, of "*congestion of the lungs.*"

Dr. Henry Jeaffreson, the distinguished physician of St. Bartholomew's, died in London, of typhus fever, on the 14th of December, aged fifty-six years.

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The Cincinnati Journal of Medicine, November and December.

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NEW YORK

MEDICAL JOURNAL,

A MONTHLY RECORD OF MEDICINE AND THE COLLATERAL SCIENCES.

MARCH, 1867.

ORIGINAL COMMUNICATIONS.

The Histological Doctrines of M. Robin. By William T. Lusk, M.D., New York.

NO. III.—TEETH—GLANDS—SIMPLE FOLLICLES—GLOMERULI—RACEMOSE GLANDS, SIMPLE AND COMPOUND—THE BREAST—THE PROSTATE—SEMINAL FLUID—DUCTLESS GLANDS—-THE LIVER—THE SKIN—THE LUNGS.

Dental Tissue.—A tooth is composed of five parts: 1st, the pulp or bulb; 2d, the ivory; 3d, the enamel; 4th, the cement; 5th, the cuticle.

The *pulp* is formed of a special substance, termed *phanerogenic tissue* (*tissu phanérogène ou phanérophore*), which consists of—1st, special, small, ovoid nuclei; 2d, elements of connective tissue at all stages of development, *i.e.*, of embryo-plastic nuclei, fibro-plastic bodies, and connective tissue-fibres; 3d, a special amorphous matter; 4th, in the phanerogenic tissue of teeth we find, in addition to these elements, concretions of phosphate of lime. This substance becomes vascular only when the mass formed by it has attained a certain volume. The *ivory* or *dentine* is characterized, like the osseous substance, by the presence of canaliculi, which are of an extremely fine character. The *enamel* is formed by the juxtaposition of specal elements,

termed *prisms* of *enamel*. These prisms are placed side by side, much in the same way as the prismatic epithelial cells. The *cement* is composed of osseous substance. In the young the layer is too thin to contain Haversian canals; but as it becomes thickened, in advanced age, the canals form as in bone of corresponding dimensions. In young persons the enamel is covered by an exceedingly delicate membrane, termed the *cuticle* of the enamel. It is transparent, hyaline, and, notwithstanding its delicacy, very resistant to the action of the mineral acids. In the adult the cuticle appears to wear away. The enamel and dentine, though non-vascular, appear to be endowed with a good deal of vitality and reproductive power. Examples of dental callus have been observed.

Development of Teeth.—Toward the 60th or 70th day the maxillary bones present upon transverse section a grooved appearance—the concavity in the inferior maxilla looking upward, that of the superior looking downward. These grooves are filled with a form of embryonic connective tissue, characterized especially by a considerable accumulation of embryoplastic nuclei. This tissue is vascular, and has been designated *sub-gingival mucous tissue*. In it, at a given moment, small, oval nuclei, characteristic of phanerogenic tissue, make their appearance, and soon form into little collections devoid of vessels, which are easily distinguished from the surrounding connective tissue. These collections are the first germs of the teeth. At the superior portion of the germ the amorphous matter of the phanerogenic tissue does not contain nuclei, but forms a clear zone, about .010 in thickness, termed the *preformative membrane*. At a later period the germ is surrounded by a very dense and vascular layer, the *follicular wall*, formed of the same elements as the surrounding tissue, but much more closely pressed against one another. The bulb (represented by the follicular part of the tooth, *i. e.*, the germ and the follicular wall) next appears, divided into two entirely distinct parts, separated by an undulatory line of demarcation—the lower part consisting of phanerogenic tissue and the preformative membrane, while the upper is occupied by a special organ of a transitory character, termed the *organ* of the *enamel*. The latter is composed of connective tissue analogous to that of the jelly of

Wharton, *i. e.*, formed of a small number of stellate, fibro-plastic bodies in an abundance of amorphous matter. It is limited upon the side of the follicular wall by a single row of nuclear epithelium, while upon the side of the undulatory line it is limited by a row of prismatic cells, which are all of nearly one size. At a further period of development the phanerogenic tissue becomes vascular, and, at the same time, upon the limit between the nuclei and the preformative membrane, there appears a single row of cells, termed the *cells* of the *dentine*. These are irregular, elongated, and in close juxtaposition. They possess a hyaline, transparent extremity turned toward the organ of the enamel, but separated from it by the preformative membrane. The part of the cell in contact with the phanerogenic tissue is granular, and contains a nucleus. The hyaline extremities next unite partially with one another, leaving, however, in the angles they form, little canals which become the characteristic canaliculi of the dentine. The canals present at first, upon section, an angular appearance, and only subsequently become rounded. Finally, the entire cells become completely transformed into dentine, and form a small, very delicate, conical or undulatory shell, called the dentinal crown (*chapeau de dentine*). The number of eminences in the crown corresponds to the number the tooth is destined to have at a later period. When the crown has extended over the whole of the phanerogenic tissue, the prisms of enamel make their appearance between the crown and the preformative membrane, which has now become very thin. Each prism appears opposite one of the prismatic cells already described as limiting the organ of the enamel; but the prisms, instead of being of equal size, like the prismatic cells, are much longer upon the summit of the crown, and diminish in size as they approach the edges. Subsequently the organ of the enamel atrophies. Its fibro-plastic bodies pass into the state of adipose vesicles. Then all the elements of the organ liquefy, and finally disappear. In like manner the superior part of the follicular wall becomes atrophied to allow the passage of the tooth, which is at this period composed of the cuticle (until now termed the membrana preformativa), the enamel and the dentine. After the disappearance of the dentinal cells the dentine grows independently.

The tooth, however, now no longer increases in a transverse direction, but in length only, by encroaching upon the phanerogenic substance, which soon forms simply the bulb of the tooth. At a still later period the cement is developed between the dentine and that portion of the follicular wall which has persisted around the root. This persistent portion thus becomes the alveolo-dental periosteum. Upon the formation of the crown of the tooth, little free masses of phosphate of lime appear in the phanerogenic tissue, and remain through the whole period of existence.

Caries of the teeth is ordinarily due to the softening of the dentine, which becomes fatty, and loses its mineral before its organic elements. The cement is frequently the source of osseous tumors, described under the name of *exodontoses*. The cement and the alveolo-dental periosteum are frequently the point of departure of the tumors of myeloplaxes, known as *epulis*. The most remarkable pathological production, dependent upon the dental system, are *tumors* formed of *phanerogenic tissue*. They are frequently of considerable size, and present the appearance of a cluster of little bulbs closely pressed together and covered by a crown of dentine, giving to the surface of the tumor a crepitant sensation. In the tissue of these tumors we find the habitual density and transparency of the phanerogenic tissue and its characteristic nuclei. In another class of these cases, however, the phanerogenic tissue may present a totally different physical appearance upon section, resembling much, in color and consistency, the tissue of a potato. These properties are due to the presence of considerable microscopic masses of phosphate of lime, analogous to those found normally in the pulp of the teeth after the appearance of the crown of dentine. All the "products" of the economy are, in a high degree, susceptible of *heterotopy*. Teeth frequently appear in this way in the ovary. It is difficult to refer these formations to the fœtus, as there is at least one observation recorded where more than 200 teeth were found. Heterotopic teeth possess all the dental constituents, viz., pulp, dentine, enamel, cuticle and cement. They are not always implanted by the root in the surrounding tissues, but may simply adhere to the walls of a cyst.

THE PARENCHYMATOUS ORGANS.—In the texture of these organs we find the constituent tissues and the "products"—connective tissue-fibres, fibre-cells and epithelium—present in nearly equal proportions. Physiologically, they are divided into two classes: 1st, the glandular; 2d, the non-glandular. The first class is characterized by the formation, from the materials of the blood, of crystallizable or coagulable products which did not previously exist in that fluid. Thus, for example, the breast produces crystallizable margarine, the glands of the stomach coagulable pepsine. The second, or non-glandular class, simply allow the passage of gaseous principles and of solids already existing in the blood. As examples may be mentioned the lungs, giving passage to carbonic acid; the kidneys, to urea, uric acid and chloride of sodium. Again, organs of this class serve to form special anatomical elements, as spermatozoa, formed by the testicle; the ovum, by the ovary.

To the glandular class belong three types: 1st, simple follicles and glomeruli; 2d, simple and compound racemose glands (*glandes en grappe*); 3d, ductless glands.

Ordinarily the *follicles* are simple culs-de-sac; sometimes they are composed of two or more lobes. These culs-de-sac are formed by walls measuring from .002–.007 in diameter, and transparent or granular, solid or friable, according to the variety. In general they resist the action of those chemical agents which dissolve connective tissue. They are found only in the substance of mucous membranes, and open upon the free surface of the same. The wall is lined with epithelium, that of the fundus differing usually from the epithelium of the neck, which is, as a general thing, continuous with the epithelium of the mucous membrane. In the rule, the fundus of the cul-de-sac alone is lined by epithelium proper to the gland. The fundus is, in reality, the secretory region, the neck representing the organ of excretion. The difference in the two varieties of epithelium corresponds to the difference in the special physiological functions. The epithelium may either fill or simply line the fundus of the cul-de-sac. In follicles destined to fill transient physiological *rôles*, as in those of the uterus, the epithelium possesses different characters, according as the organ is or is not in a state of functional activity. Vessels do not penetrate

the walls of follicles, but the external surface of the follicular wall is covered by a close network of capillaries, the interspaces of which are frequently finer than the vessels themselves. *Secretion* results from the action of the wall and its epithelium upon the blood. The processes of assimilation and "disassimilation" occur with special rapidity in the epithelium. The product of the latter process constitutes secretion. Under pathological conditions, we often see an arrest of secretion arising from the epithelium choking up, instead of lining, the conduits of certain follicles.

Simple follicles are found in the stomach, the large and small intestines, the cervix and body of the uterus, and in the vas deferens.

The Glomeruli.—In the fœtus, up to the eighth month, we notice narrow tubes, which are open upon the surface of the skin and closed at the lower extremity. At this period they resemble in all respects very elongated simple follicles. After the eighth month the lower extremity begins to curve, and gradually winds and twists upon itself. In the adult the twisted extremity constitutes the glomerulus or secreting part, and is lined by a special epithelium. The rectilinear or excretory part of the tube is lined by an epithelium continuous with that of the skin. M. Robin subdivides the glomeruli into two kinds: 1st, sudoriparous glands; 2d, axillary follicles. The latter are larger than the former, and secrete an alkaline, strong smelling liquid. There are no such things as *ceruminous glands.* In the auditory tube the cerumen is formed by a mingling of the secretion of the sudoriparous and sebaceous glands.

Racemose Glands.—The multilobar follicles may be considered as leading insensibly to the racemose glands. In the latter there is a clearly marked distinction between the excretory and the secreting portions. The secreting part is composed of a greater or less number (15 to 40) of culs-de-sac, each constituted like the fundus of a simple follicle. These culs-de-sac open into a common canal, the walls of which are formed of connective tissue-fibres—generally, too, there is an abundance of elastic fibres, and sometimes fibre-cells. The epithelial lining of the canal differs from that of the culs-de-sac. In no case

is the structure of the canal similar to that of the mucous membrane. As regards form, the culs-de-sac offer considerable variety; thus they may be rounded, elongated, varicose, etc. They are almost always in direct contact with one another, without the interposition of any anatomical element. The *ensemble* of these culs-de-sac constitute what was called by the older anatomists an *acinus*. Around each acinus we find connective tissue-fibres and many fibre-cells. The capillaries are not distributed to each cul-de-sac, but form an extremely close network around the acinus. Sometimes, however, as in the glands of the pituitary body, a cul-de-sac may be separate from the rest of the acinus, in which case the capillaries are distributed about the isolated cul-de-sac as though it were a simple follicle. Glands having but one acinus are termed *simple racemose glands*. To this variety belong the sebaceous, the conjunctival, the naso-tracheal, the Meibomian, the urethral glands (glands of Littré), and those of the œsophagus. The *compound racemose glands* may be considered as the union of several of the simple variety, with a common excretory duct. As regards vascularity and the character of the fibrous and muscular envelopes, the description given of the simple glands applies equally to the acini of the compound ones. The acini are separated from one another by a greater or less quantity of connective tissue, which, when abundant, gives density to the gland, as in the parotid and breast. When present in small proportions the gland is friable, as, for example, the sub-maxillary. Each acinus has its proper excretory canal, and all the canals unite together, two and two, like the branches of a tree, without ever anastomosing. The gland may have but one common excretory canal, as the ducts of Wharton and Steno; or they may possess several, as in the prostate and mammary gland. Both in a pathological and physiological point of view, either of these organs should be considered as the union of several independent glands.

The *development* of the racemose glands may be studied very well in the embryo. They are late in making their appearance, *i. e.*, after the connective tissue, the cartilage, the bones, and, above all, after the skin and mucous membranes, in which their ducts are contained, have been clearly defined. We first notice the appearance of a small, hyaline, transparent substance beneath

the skin, but distinct from it, and only in contact by one extremity. This substance grows, becomes hollow, and fills with epithelium formed in the cavity. This cavity represents, not the excretory duct, but the secreting part of the gland. It has no relation to the skin or mucous membrane, beneath which it is situated. It is not until a later period that the duct, differing anatomically and pathologically, makes its appearance. To the compound racemose glands belong the pancreas, the breast, the prostate, the bile-producing liver, the salivary and lachrymal glands, and those of Brunner, Cooper and Bartholini.

The *mammary gland* presents functional differences, according to the existence or non-existence of gestation, and varieties of structure corresponding thereto. In order to compare it with other glands, it is necessary to consider it in a state of functional activity. Then the acini become very large, and are composed of a considerable number of elongated, irregular, varicose culs-de-sac. The wall is thick, easily isolated, and not lined by epithelium. Upon its internal surface there is simply a thin layer of amorphous granular matter, while each cul-de-sac is filled with globules of fat and milk serum. These globules are largest at the centre of the culs-de-sac. As lactation diminishes, the culs-de-sac are observed to be lined with pavement epithelium. When lactation ceases, there remains simply a nuclear epithelium, and at the same time a change occurs in the aspect of the culs-de-sac. These become reduced to from 2 to 4 sacs (*bosselures*), filled with nuclear epithelium, at the extremity of a long excretory canal. The acini, thus reduced, occupy so little space that the framework of the gland alone gives to it its peculiar characteristics. The tissue becomes a pale rose instead of yellowish, dense and fibrous instead of friable and glandular. This state, in which the acini are represented by a small number of culs-de-sac, very short, far apart and full of nuclear epithelium, is the embryonic condition of the gland, and is very common at the periphery of mammary tumors.

The breast has no specific *pathological alterations*. Those that we are about to describe may be met with equally in all the glands of the economy. It is even uncertain whether the breast is more frequently affected than other glands, only as

the breast is not so necessary to life, its alterations may proceed further. It is to be borne in mind that the breast is composed of several distinct glands, each having its own excretory duct, and susceptible of becoming individually diseased.

The commonest lesion consists of a *hypertrophy* of the *glandular culs-de-sac*, with hypergenesis of the contained epithelium. This hypertrophy, however, never brings about those anatomical conditions which belong to the gland when performing its functions. The epithelium affected with hypergenesis fills out the culs-de-sac. It may remain nuclear or become polyhedral by the segmentation of the interposed amorphous matter, and may present all the alterations we have described as peculiar to epithelial cells. At the same time there takes place at the periphery of the tumor a formation of new culs-de-sac of the embryonic form. All the epithelial cells may fill with yellowish granulations. When the tissue thus formed is hard we have *schirrus;* when the tissue is soft, and this coincides usually with the presence of fat granules, we have *encephaloid;* if the tissue is very vascular we have *fungus hematodes.* There may be a certain amount of liquid between the anatomical elements of a mammary tumor. If now we remove the liquid, together with either nuclei or fatty granulations, by scraping the cut surface of the tumor with the blade of a knife, we have the *cancerous juice.*

It may happen that, while the hypertrophy of the gland is going on, there may be at the same time actual atrophy of the connective tissue between the acini and the culs-de-sac of new formation. If this latter process is out of proportion to the increase in the glandular elements, the organ dimishes in volume and becomes hard and dense, forming *schirrus.* The elastic fibres of the ducts persist, however, for a long time in the form of yellow filaments, and constitute the *elastic reticulum.* After the atrophy of the connective tissue interposed between the hypertrophied culs-de-sac, the walls themselves may disappear, and then the epithelial elements come into immediate contact with those of the constituent tissues surrounding the organ. As the "products" increase with greater rapidity than the constituent tissues, the latter quickly yield to the encroachments of the epithelium. At the same time that alterations take place

in the epithelium of the breast, epithelial tissue of new formation analogous to the altered form appears in the vicinity of the breast and especially in the lymphatic glands of the armpit. This species of heterotopy is the *cancerous infiltration* of the older surgeons. Coincident with these alterations in the breast certain changes may take place in the epithelial tissue of the skin, and ulceration result after a manner to be described in considering epithelioma.

There are still other tumors of the breast constituted by the simple hypergenesis of the mammary tissue. This pathological tissue has absolutely the same composition as the breast in the state of repose. It frequently forms large encysted masses, appearing first at the periphery of the breast, which are due to the absence in the glandular substance of excretory ducts. Whether the latter really existed, and have disappeared, is unknown. In general, these encysted tumors do not recur after removal. However, so long as we are ignorant of the cause producing the first, we can never tell whether the same cause may not produce a second tumor.

In certain points of the economy, far from any gland, we may find glandular tissue of new formation. This is known as *heteradenic* tissue. It may be developed even in nerves. Up to the present time three varieties have been described: 1st. The pathological tissue is composed of a large number of irregular culs-de-sac, forming acini which have no excretory duct. Around them, as around the acini of the breast, we find a thin layer of connective tissue. The culs-de-sac are composed of a wall proper, analogous to what exists in the mammary gland, lined by epithelium varying in different tumors. In the cavity there exists a certain amount of colorless liquid. 2d. The glandular tissue is formed of tubes, more or less regular, and bent upon themselves. These tubes are composed of a wall proper, which is either lined or filled with epithelium varying in different pathological tissues. In these tubes we frequently find special bodies, termed the "oviform bodies." The latter are spherical in form, elastic, and vary from .020–.200 in diameter. The centre is occupied by a granular contents measuring from .010–.015 in diameter. The rest of the body is composed of a transparent and very finely striated substance. 3d. The epi-

thelial masses form solid cylinders, without wall or central cavity, so that the epithelium of these tumors is found in direct contact with the surrounding conective tissue.

The *prostate* is analogous to the breast in being really composed of several distinct glands, each with its proper excretory duct. In the prostate the secreting culs-de-sac are separated by intervals from one another, so that, properly speaking, they do not form acini. It is in the interior of the culs-de-sac and their ducts that the pretended amyloid bodies of the prostate are found. These frequently become the centre of phosphatic concretions (calculi of the prostate). When they attain to a great size, as in persons past fifty years of age, they distend the culs-de-sac and form cysts. The interposed substance of the prostate is essentially composed of muscular tissue, which forms at least half the volume of the organ. The prostate secretes a special liquid, which in itself is without odor, but when mixed with the secretion of the seminal vesicles, even in default of the testicular secretion, becomes viscid, and possesses the spermatic odor.

The *sperm* is composed by the union and reciprocal action of several liquids, viz.: 1st. The secretion of the testicles (spermatozoa). 2d. Secretion of the follicles of the vasa deferentia. 3d. Secretion of the walls of the seminal vesicles. These three form a brownish, non-viscid, inodorous fluid. 4th. The prostatic secretion, whitish, non-viscid and inodorous. 5th. Liquid from the glands of Cowper. 6th. Liquid from the glands of Littré, which is transparent and viscid. Thus after the loss of the testicles a person may emit a fluid—only the spermatozoa will be wanting.

Vascular Glands (without external ducts).—These are organs in which the product of the action of the epithelium upon the blood reaching the organ is poured directly into the blood which leaves the same. They are formed by the union of several glandular granules *(grains glanduleux)*, each of which is provided with a wall, analogous to those of glandular culs-de-sac, and either lined or filled with some variety of epithelium. The different granules are separated from one another by a certain amount of connective tissue in which vessels are contained. In general, the capillaries form a network more or

less fine around each glandular granule, as around an acinus. Sometimes the capillaries, as in the glandular culs-de-sac, do not penetrate the walls; at others they pass through them and form a network in the midst of the epithelium, as in the closed follicles of Peyer, in the thymus and in the spleen. There is still another class of ductless glands, in which the glandular granules are not surrounded by a limitary membrane, but are separated from one another solely by the connective tissue, as in the supra-renal capsules and the glycogenic liver.

M. Robin considers the liver as composed of two distinct organs, which he terms, in accordance with their respective functions, the glycogenic and the bile-producing liver (*foie biliaire*).

The *glycogenic liver* is formed by the union of many glandular granules[1] (lobules of the liver).

Each granule is composed of a large number of polyhedral epithelial cells, containing one or two nuclei. These are the hepatic cells. Each granule is, moreover, surrounded by a thin layer of embryonic connective tissue, in which are many fusiform and stellate bodies. This connective tissue is continuous with that accompanying the vena porta to its entrance into the liver. Each granule is surrounded by an extremely fine capillary plexus, such as covers a glandular acinus. From this plexus capillaries are given off which pass between the hepatic cells, and converge toward the centre to form the origin of the hepatic vein. The latter not being surrounded by connective tissue, like the vena porta, but by the non-elastic substance of the gland, remains open upon section of the liver.

The *bile-producing liver* is composed of "acini" at the extremities of the hepatic ducts. These "acini" are identical with those found in the prostate, *i. e.*, the culs-de-sac are separated from one another by intervals, and not united into spherical masses—an arrangement giving to the acinus the general appearance of a fern-leaf. They are lodged in the connective tissue partitions which separate the glandular granules, and

[1] If we tear the tissue of the liver it separates in granulations, which have been termed "acini" in descriptive anatomy. These glandular granules, however, bear but slight analogy to what have been called acini in the compound racemose glands. Pouchet, Un Précis d'Histologie, p. 274.

are the secreting organ of the bile. The hepatic ducts have this remarkable peculiarity, viz., contrary to what we find in all other glands, they anastomose with one another, so that the entire biliary organ may be injected by a single division of this canal. The capillary plexus surrounding the secreting culs-de-sac come from the hepatic artery, and not from the vena porta. There is a certain manifest relation between the functions of the glycogenic and those of the bile-secreting liver. However, contact with the glandular granules does not appear indispensable to the integrity of the biliary function, for the vasa aberrantia are composed of ducts passing to biliary culs-de-sac situated outside the liver, and in contact simply with connective tissue.

Under the influences of civilization, the hepatic cells almost always contain fatty granulations—a condition that does not exist in the savage state. Domesticated animals present this peculiarity as well as civilized man. Under certain influences, these granulations unite, and form oil globules, each contained in a separate cavity hollowed out of the substance of the cell. At a more advanced stage, these small oil globules may unite to form one large one. The cell may then increase in size, lose its shape, and, finally, form simply an envelope containing a drop of fatty matter. The nucleus may always be distinguished in the envelope. In becoming fatty, the tissue of the liver assumes new physical properties corresponding to the new constitution of the elements. It becomes an opaque yellow, and is very frequently hypertrophied. The fatty condition is usually consecutive to diseases of the heart and lungs. A very advanced stage is usually found in phthisis. The appearance termed *nutmeg liver* is due to the fatty condition of the peripheral hepatic cells in each glandular granule —the central cells remaining normal. It is a very common condition to diseases of the heart. Usually, however, it is not accompanied by hypertrophy of the organ, as is the case in the fatty liver of phthisis. In paludal intoxication, M. Frerichs has shown that the pigmentary granulations are disposed in nearly the same way in the glandular granules. This is especially the case at the periphery of the organ. In *acute softening*, often described as malignant jaundice (*ictire grave*),

the hepatic cells pass into a liquid state. In the resulting pulp a certain number of nuclei may be found remaining. In spots, this pulp is filled with fatty granulations, which come, according to all appearance, from the granulations contained in the liquefied cells. At the same time, the partitions which separate the glandular granules become thickened. This probably takes place very rapidly. In *cirrhosis* we find, in like manner, a considerable thickening of the partitions between the glandular granules. The thickened partitions are composed of connective tissue-fibres fully developed, and not in the state of fusiform and stellate bodies. At the same time, the capillary plexus of the vena porta, normally contained in these partitions, almost wholly disappears. The hepatic cells atrophy. The biliary organ probably undergoes no alteration. The *waxy liver* is caused by the presence in the glandular granules of concretions, termed *sympexions*, which, little by little, take the place of the hepatic cells. The sympexions are transparent concretions, rounded in form, or polyhedral from reciprocal pressure, and of nearly the consistency of wax. Chemically, they are found to possess a nitrogenous constitution, analogous to that of fibrin. They differ from the amyloid bodies chiefly in their homogeneity. This alteration is common in the lymphatic glands, in the spleen, in the closed vesicles of the thyroid, and in the seminal vesicles of old men.

The *skin* is composed of the derma and epidermis. The derma is composed of connective tissue; but the superficial part consists almost entirely of the amorphous matter of that tissue. This part has received the name of the *papillary layer*, because it contains a certain number of eminences formed by the papillæ. Each papilla contains either capillaries or nerve-tubes. The sensibility of the skin is not, however, proportioned to the presence of the nerve-tubes. The papillæ of the matrix of the nails are vascular; none are supplied with nerves. Above the derm, the epidermis is divided into two layers, viz., the deep layer, or rete mucosum, and the superficial or horny layer. The deep layer is composed of epithelial nuclei, around which the amorphous matter may or may not be segmented. The horny layer is composed

of lamellar cells, of which those lying deepest have a nucleus. This nucleus, however, disappears as the cells become more superficial by the incessant desquamation of the surface of the epidermis.

The *encysted tumors* (méliceris, atheroma, etc.) are due to the dilatation of the sebaceous glands, of which, first, the ducts become stopped, then the culs-de-sac unfold and fill with the retained secretion, forming, in this way, a round mass. They are, therefore, not true glandular hypertrophies, but a disease due to obliteration of the excretory canal. Exceptionally, the epithelium, normally filling the sebaceous glands, consists of cells which possess a cell-wall, a nucleus and a cavity.

The epidermis is *developed* before the derma. When segmentation of the vitellus occurs, a portion of the vitelline globes are disposed about the periphery of the vitelline membrane. These globes enlarge, become nucleated, and are rapidly metamorphosed into pavement cells, which become, at the same time, the epithelium of the embryo, and the lining epithelium of the amnion. At the umbilicus, the epithelium of the former becomes continuous with that of the latter. These first epithelial cells are formed out of a portion of the vitelline globes, before the transformation of the remainder into embryonic cells has taken place.

The epidermis is subject to a great number of pathological alterations. *Hypergenesis* of the *epidermis* may take place either in an external or internal direction. To this class belong the horny tumors, corns, and the callosities upon the hands of workmen. They are characterized, essentially, by the hypergenesis of very hard, hygrometric, lamellated epithelium. In certain cases, this hypergenesis penetrates more or less deeply into the derma, so that the papillæ appear considerably elongated; but in these cases the epithelium, interposed between the papillæ, preserves its characteristics. *Epithelioma* is a very similar pathological alteration. It is formed solely by the hypergenesis of cells, which are soft, and which undergo destructive changes with great rapidity. These cells form prolongations into the derm, bearing some analogy to glandular culs-de-sac, but without a wall proper. The prolongations penetrate between the papillæ, which thus become

considerably elongated. This epithelium, composed of soft cells, for some reason, of which we are ignorant, possesses little vitality, and perishes on reaching the surface. There thus results a loss of substance, the ulceration of the epithelioma, of which the bottom is formed of soft anatomical elements, and from which an oozing proceeds continually. An ulceration is always due to the individual necrosis of a certain number of anatomical elements. We frequently meet, in epithelioma, with epithelial cells disposed spherically around a common centre, and forming what have been termed *epidermic globes*. We are ignorant of the manner in which these globes are formed. They may become quite large (2 to 3 millimetres), constituting the so-called *pearly tumors*. The *epithelioma* of the *cervix uteri* proceeds from the simple follicles of the neck. These present the glandular alterations of which we have spoken in connection with the breast. At the same time, heteradenic tissue appears in the substance of the organ beneath the follicles, and gradually increases as the interposed framework is encroached upon by the epithelium, and the epithelium itself disappears by successive necrosis. In the *cicatrization* of the skin, the granulations are composed of connective tissue in the embryonic state, in which special elements, of great importance in the alterations of the skin appear, viz., the *cytoblastions*. These are round nuclei, .004–.005 in breadth, possessing considerable resistance to the action of chemical reagents. They are found abundantly in all syphilitic alterations of the skin, such as the gummy tumors, mucous patches, and the induration of chancres. The epithelium, which forms upon the surface of wounds in the process of cicatrization, is composed, at first, of a single layer of epithelial cells analogous to those of the fœtus, the elements of which are formed by the segmentation of a thin layer of amorphous matter upon the surface of the granulations.

The Lungs.—The lungs present, as objects for our study, the vessels, the bronchi which convey the air, and the pulmonary parenchyma in which are performed the physical actions of which the lung is the organ. The bronchi offer, to the most distant ramifications, the same structure throughout. They are lined by a mucous membrane, with a ciliated epithelium.

They terminate in certain small organs termed pulmonary canaliculi, consisting of groups of culs-de-sac upon a common canal, and recalling, as to their general arrangement, the glandular culs-de-sac. These canaliculi differ in structure and in function from the bronchi. They are the seat of respiration, and are composed of a very thin wall (.001, nearly), lined by pavement epithelium. Externally, the wall is covered by a close network of capillaries. The tissue interposed between the canaliculi is composed almost entirely of elastic fibres.

If, upon cutting into a lung that has been inflated and dried, we divide a lobule so as to involve the ramified groups of pulmonary canaliculi, we will have presented the appearance of a cavity, furnished with partial septa limiting cells, which, by reason of the shrinking of the tissues, appear to open into the central cavity. This appearance, which is purely the result of the manner of preparation, was long regarded as furnishing an exact representation of the normal structure of the organ.

The capillaries of the respiratory fibres proceed from the pulmonary artery, while those of the bronchial mucous membrane come from the bronchial artery. The inflammation of the first constitutes *pneumonia*, of the second, *bronchitis*.

Among the frequent alterations of the lungs, we must signalize the return to the *fœtal state*, in which the walls of the canaliculi retract upon themselves so as to contain simply epithelium, and are without a central canal to permit the access of air. In pulmonary *induration*, a large quantity of very granular amorphous matter and coloring matter of the blood is interposed between the respiratory canaliculi. We find, as a rule, in the elastic tissue of the lung parenchyma, a certain proportion of black matter, which is due, not to pigment, but to nearly pure charcoal. The excess of this normal condition is termed *anthracosis*. *Emphysema* is the dilatation of the respiratory canaliculi. *Dilatation* of the *bronchi* likewise may occur, in which case they preserve their characteristics, and the dilatation continues to be lined with ciliated epithelium. The *caverns*, on the contrary, are ulcerations of the pulmonary tissue, and are lined only by anatomical elements in course of putrefaction and elimination. There may form in the lungs a large number of little gray masses, which have been termed

miliary tubercule, or, still better, *gray granulations*, the tissue of which is analogous to the product of the same name in the arachnoid and the peritoneum. They are composed of amorphous matter, fusiform bodies, capillaries, and a certain number of epithelial cells, analogous to those of the respiratory canaliculi. The number and even abundance of the elements of connective tissue in these morbid products, is suggestive of their being due to a hypergenesis of these elements. This much we know, that, in addition to the connective tissue accompanying the vessels, a certain number of connective tissue-fibres are found in the parenchyma itself of the lungs, between the elastic fibres, which are the fundamental element. It is certain, too, that this connective tissue is susceptible of hypergenesis. M. Robin has described an *epithelial miliary tubercle*, formed of little masses of nearly the same volume as the gray granulations proper, but composed solely of the epithelium of the respiratory canaliculi. As the cells which make up these masses contain a certain proportion of fat granules, they are white, and not gray like the preceding variety. *Crude tubercles* are composed of non-vascular masses, formed of the pretended tubercle corpuscles. The latter are either altered epithelial cells, or segmented amorphous matter. M. Robin has long defended the first hypothesis, and would thus connect crude tubercle with the development of the epithelial miliary form, rather than with that of the ordinary gray granulation. Up to the present time there is nothing to justify the assumption that *calcification* is the reparative process of crude tubercle. According to all appearance, the calcareous granulations are deposited primitively in the tissue of a tubercle in the process of evolution, in which case they simply replace the fatty granules ordinarily deposited in the passage to the phymatoid state. The *caverns* are due to the invasion and destruction of a bronchial tube by a tubercle. The phymatoid mass then escapes, and air comes into direct contact with the ulcerated tissue.

The foregoing illustrations serve to show the main points of difference between the French and German schools. Especial stress is laid upon the study of the development of tissues, in virtue of M. Robin's cardinal teaching, that the embryonic

state is the sole school in which to learn the true nature of pathological tissue. "The eternal law of the continuous development of tissues out of one another" does not find favor in France. On the contrary, in spite of the evil repute into which spontaneous generation has fallen, the doctrine, in the limited form of "birth by genesis in blastemas," plays an important *rôle* in the French system. Theory, M. Robin regards as useful only so long as it serves to explain all the facts in our possession. Thus far theory stimulates inquiry, and gives method to investigation. But theory should be abandoned, so soon as new facts and observations show it to possess only partial application. He therefore refuses to be bound to-morrow by what he may teach as probable to-day. This principle begets caution, and leads him frequently to stop short and wait for new developments, when plausible conclusions lie temptingly near. In a word—and this is one of his chief merits—M. Robin has labored rather to add to science new and well observed facts, than to furnish a key to the universe; he has sought not to make the laws, but to find them.

A Case of Ovariotomy. Reported by GEO. SEYMOUR, M.D., of Pulaski, N. Y.

Miss A. B., æt. 23 years. In the spring of 1860 this patient, then 17 years of age, first noticed a tumor in left iliac region, which grew rapidly, and in the fall of that year she was tapped, by Drs. Kinney and Clark, at which time eleven pounds of albuminous fluid were drawn off. In the spring of 1861 was again tapped and thirteen pounds of fluid, more inspissated than before, were drawn off. Health at this time feeble. From this time the tumor ceased to grow for about three years, and the health of patient improved, after which it again commenced growing rapidly, and in the spring of 1866 was tapped by Dr. J. N. Lyman, of Mannsville, N. Y., who, with much difficulty, obtained about eight pounds of serous and gelatinous fluid. After this, abdomen increased rapidly in size, causing great difficulty in breathing, and rendering it necessary to perform the operation again in August, 1866, when about fifteen pounds of semi-fluid

matter, less inspissated than last previously drawn, were removed. Seven weeks from this the condition of patient again demanded an operation, and Dr. F. S. Law, of Pulaski, N. Y., being in consultation with Dr. Lyman, tapped her and drew off twenty pounds of fluid, serous and albuminous in character. At this time an enlargement was noticed in left hypochondriac region, extending over across epigastric region, which had not been noticed before. Whether this enlargement was a part of main tumor was not altogether certain, as it became prominent upon evacuating the main tumor. It partially subsided in the course of twenty-four hours after tapping.

Oct. 11. Abdomen again filling up rapidly and patient very much exhausted and emaciated; pulse feeble; respiration difficult. The consent of patient and friends being at this time obtained, it was decided by Drs. Law, Lyman, and Kinney that ovariotomy should at once be performed. Accordingly, on the 13th, Drs. Law and Lyman, assisted by Drs. Kinney, Bulkley and Seymour, proceeded to remove the tumor. The bowels having been previously evacuated by means of injections, and the temperature of the room brought to about 70° F., the operation was commenced by tapping and drawing off eighteen pounds of serous and albuminous fluid. Chloroform was then administered by Dr. Seymour, patient coming kindly under its influence in about ten minutes. Dr. Law then made an incision along the median line and to one side of umbilicus, from two and a half inches above umbilicus to within an inch of the pubes. Found quite a quantity of serous fluid in abdominal cavity, tumor filling whole cavity and pressing heavily up against diaphragm, especially in left hypochondriac region, where there were some adhesions. Tumor much constricted about two inches below umbilicus. The portion above had not been evacuated by tapping, and the cause of enlargement in left hypochondriac region, previously spoken of, was now fully explained. In the right lumbar region an opening into the tumor was noticed about the size of a crow's quill, through which fluid escaped when pressure was made upon the tumor, which accounts for the fluid in the abdominal cavity. It now became necessary to evacuate the tumor in order to allow it to pass through the incision. An incision was made into it, and the cysts broken down

with the hand. It proved to be multilocular, and the cysts filled with albuminous, gelatinous and serous matter, which was removed with the sponge, allowing as little as possible to escape into abdominal cavity. Pedicle about two inches in length, three in width, and from one-half to three-fourths of an inch in thickness. The mass was now drawn out and a strong silk ligature applied about the centre of the pedicle, which was cut off with a red-hot iron for the purpose of preventing hemorrhage. The abdomen was then carefully sponged out and the edges of the wound brought together and held by means of steel needles (passed deep through peritoneum) and adhesive strips. Left ligature on the pedicle, which was brought close in contact with abdominal wall at lower end of incision, and held there by means of a small piece of wood placed across the abdomen, to which the ligature of the pedicle was attached. Patient kept fully under influence of chloroform about twenty minutes. While anæsthetic influence was passing off, gave her tinct. opii., ʒj., and in about twenty minutes opium suppository, gr. vi. Operation completed about four P.M. At nine P.M., same day, found patient comfortable and entirely free from pain. Ordered suppository every four hours; took a little milk.

Oct. 14th, 9 A.M. Looks bright and cheerful, and says "she is bound to get well;" has had some nausea and vomited twice; tongue a little dry; pulse 120 and stronger; says she has passed the best night in three months; unable to pass urine, and some pain in region of bladder; introduced catheter and drew off eight ounces high colored urine, which gave relief. Ordered suppositories continued and beef tea every four hours.

From 14th to 17th remained much the same.

17th. Removed two of the pins and a part of silk sutures. Union had taken place along the whole length of the incision, save at the lower end, where ligature came out; pulse 120 and more full; tongue covered with a brown coating; no movement of bowels since operation.

19th. Pulse 120; very sick at stomach; continued suppositories, and ordered potass. chloras., gr. ij., in solution every three hours.

20th. Looks badly; pulse 120, somewhat feeble; nausea continues; bowels somewhat tympanitic and in considerable

pain; continued suppositories and chlorate potassa, and ordered hydg. chl. nit. gr. jj., pulv. opii gr. ss., every six hours. Removed remaining sutures.

21st. Symptoms much as yesterday; ordered seidlitz powder, to be followed by enema of castile-soap and water in six hours. Calomel discontinued.

22d. Pulse 120 and stronger; tongue more moist and improved; tympanitis entirely subsided; nausea much less; looks bright and feels pretty well. Removed remaining pins.

Nov. 1st. Up to this date have drawn off urine twice each day with catheter; to-day patient has passed it voluntarily; is doing well.

Nov. 7th. Ligature came away; patient able to sit up most of the time.

Nov. 15th. Goes about the house and feels well.

The weight of fluid drawn from tumor by trochar before incision into abdomen was eighteen pounds; weight of fluid taken from cysts after incision, twenty pounds six ounces; weight of cysts after evacuation, eight pounds four ounces; making, in all, the weight of tumor to have been forty-six pounds ten ounces previous to operation.

The interesting points in this case are these, viz.:

First. That after the second tapping the tumor ceased to grow, and the patient enjoyed good health for about three years.

Second. The enlargement in left hypochondriac region and the constriction below umbilicus, rendering diagnosis difficult.

Third. The large quantity of fluid in abdominal cavity, which had evidently escaped from the tumor through the opening noticed in right lumbar region. Query: Was the opening into the tumor made by first or second tapping and pushed over to right side by growth of tumor? or was it the result of ulceration, or rupture of the cyst?

Fourth. The very feeble and debilitated condition of the patient, almost forbidding the operation, and the immediate relief following it.

Fifth. Although the incision was full eight inches long, no peritoneal inflammation ensued, and union "by first intention" took place along its whole length.

Sixth. The pedicle was not left outside the abdomen, but drawn in close apposition to the inner wall of the abdominal cavity, and held there by means of a ligature tied over small pieces of wood resting across the abdomen, so that the pus and slough from stump of pedicle came out by side of ligature instead of escaping into abdominal cavity.

Remarks upon the Anatomy and Physiology of the Ciliary Muscle in Man. By B. Joy Jeffries, M.D.

[Read before the American Ophthalmological Society, June, 1866.]

At the meeting, last year, of the Society, I made some remarks on the anatomy and physiology of the ciliary muscle in man, and as recent investigations have seemed to confirm them, I shall take the liberty of presenting these in support of my views.

I said that I followed others in considering that the ciliary muscle in man, by contracting upon its origin, slackened up the suspensory ligament, and thus allowed the lens to become more convex—thereby accommodating the refractive media of the eye to divergent rays of light from near objects, and focussing them on the retina.

In putting together the anatomical accounts of this muscle, I could not make out that the muscular fibres known as Müller's circular fibres were a distinct mass, together enabled to act as a separate part of the whole muscle. In this I am now further confirmed by Mr. George Meyer's (medical student in Bremen) essay on the comparative structure of the annulus ciliaris in man and mammals, to which a prize was awarded by the Faculty of Heidelberg, and published in R. Virchow's Archiv, November, 1865.

Meyer states that "the *annulus ciliaris* in *man* is attached by a very thick fibrous net to the posterior and inner wall of Schlemm's canal, and over a short space of the adjacent sclerotic. The fibre bundles run in various directions from Schlemm's canal, some as a meridional layer, directly backwards, lying close against each other to their insertion in the choroid,

and others in a curve from outwards inwards (concavity towards centre of eye). These last bundles form numerous intercommunications, and divide up into several smaller ones to again unite further on. There are thus formed numerous open spaces, which are mostly filled with Müller's circular fibres. These open spaces are more frequent over the ciliary processes, and, therefore, most circular fibres are here found. These circular fibres also frequently interlace; often some of the muscular bundles pass from their meridional direction into a circular one."

Prof. J. Henle's description and drawings of the ciliary muscle, lately published, agree with Meyer's. In his physiological remarks he considers "that the action of the circular and meridional fibres mutually assist each other in increasing the thickness of the muscle." He says accommodation is "produced, as far as we can now see, by the ciliary muscle, but in what manner this latter acts is still *unproved*."

In answer, therefore, to inquiry, and in explanation of my views, I would say, that I cannot consider the results obtained by Mr. Hancock's operation as in any way due to the incision of the ciliary muscle, and cannot see why a similar result should not follow opening of the globe further back, where there will be less danger of wounding the iris, zonula zinnii, and lens.

I have thought that the annulus ciliaris, or ciliary muscle, differed so much in animals from man, that it was useless to attempt to adduce from them its mechanism in accommodation in the latter. Meyer's investigations seem to bear me out in this also, as may be gathered from the deductions resulting from his investigations. He concludes that—"The *annulus ciliaris* of the *apes* consists of very long, contractile fibre-cells. Its topographical relations greatly resemble the human as regards origin, insertion and form. Open spaces are rarely present in the tissue, and Müller's fibres are entirely wanting.

"The *annulus ciliaris* of the *carnivorous* animals is muscular in character, its fibres run from before directly backwards, and leave no interspaces. The circular muscular bundles and the so-called intercommunicating fibres are entirely wanting.

"The *annulus ciliaris* of the *rodents* is formed either of sub-

scleral tissue or true connective tissue; it is, at any rate, very insignificant, and in some hardly perceptible.

"The *annulus ciliaris* of the *pachydermata* consists of connective tissue, the separate bundles of which lie, without interspaces, so close together as to render them readily mistaken for muscular fibres. The ciliary band is in them comparatively thin, but extends far backwards.

"The *annulus ciliaris* of the *solipeds*, of the horse, namely, consists of a fine net of connective tissue, which is stretched transversely from sclerotic to choroid. The whole tissue is thin and insignificant, and there is no appearance of a compact mass.

"The *annulus ciliaris* of the *ruminants* appears as a firm mass of grayish white color, consisting of connective tissue. It is wedge-shaped, placed between the sclerotic and choroid, and varies considerably in its dimensions. The individual bundles lie here also close together, so as to leave no interspaces."

Meyer gives plates of longitudinal sections of the ciliary muscle of a wildcat and the annulus ciliaris of an antelope.

In the last number for 1865 of the Archiv für Ophthalmologie, Dr. Heiberg, of Christiana, has published an article on the anatomy and physiology of the zonula zinnii, in which he concludes, from microscopic examination, that there are in it true muscular fibres, which, he thinks, by pulling on the capsule of the lens, flatten the latter, and thereby adapt it for rays from distant objects, producing what has been called negative accommodation. He gives microscopic drawings of these fibres from the zonula of the horse and also from man, resembling the striped muscular fibre of animal life with nuclei. Were this positively so, it certainly would be a very important fact; but Prof. J. Henle, of Göttingen, has, in the last published portion of his Systematic Human Anatomy, shown that this transverse marking is quite different from that of muscle of animal life, and is due to a very fine folding of the fibre, caused by the action of the acetic acid—the same as is produced on fibres of connective tissue. The zonula fibres are nearest allied to fibres of elastic tissue, yet differ from these in their reaction to acetic acid and potash. Finkbeiner thought he found striped muscular fibres in the zonula. Nuhn, as Dr. Heiberg, found that a certain proportion of these fibres became striped from the action of the acetate of

the oxide of lead and acetic acid, and thought, therefore, as others (Camper, Retzius), that they were muscular, although this could not be proved, either chemically or by electric irritation. Dr. Heiberg insists, however, that he found these fibres in the fresh horse's eye, before being subjected to the action of any chemical agent.

It would seem as if these fibres were but the peculiar tissue of the zonula. They are distributed through it all around the lens, as an elastic suspensory ligament—when considered together, recalling the zonula and ligament of some of the larger fishes.

Dr. Jeffries exhibited Henle's, Weber's and Heiberg's plates, and enlarged drawings of Weber's sections, a diagram in illustration of accommodation, and dissections of the eyes of the horse-mackerel (*Thynnus vulgaris*), the sword-fish (*Xiphias gladius*), and the common small phoca of our coast, to explain and prove his remarks and deductions.

A Memoir on Osteo-Myelitis. By John A. Lidell, M.D., late Surg. U. S. Vols., in charge of Stanton U. S. Army General Hospital, Inspector Medical and Hospital Department Army of the Potomac, etc., etc.

[Read before the N. Y. Academy of Medicine, Dec. 19, 1866.]

This term, derived from two Greek words, *οστεον*, bone, and *μυελος*, medulla, or marrow, signifies *inflammation of the medullary tissue of bone.* As the word periostitis is employed for a symbol to represent inflammation of the tough periosteal membrane, and ostitis to represent inflammation of the calcified bone tissue, so the term osteo-myelitis is used to signify inflammation of the soft medullary tissue or marrow. The statement, therefore, of M. Jules Roux, representing that osteo-myelitis is inflammation of bone in its totality, is not correct. For the production of the last named affection it is requisite that there should be not only inflammation of the medullary tissue, but also inflammation of the osseous tissue, or ostitis, and inflammation of the periosteal membrane, or periostitis. Now, while it happens not unfrequently that inflammation of the marrow is associated with either coincident or consecutive inflammation of the bone tissue and the periosteum—and this remark is especially true of cases of this disease that

have either become chronic or have a spontaneous origin—it also happens not unfrequently that we meet with cases wherein the inflammation of the medullary tissue has reached the stage of suppuration, and at the same time the osseous tissue and the periosteum present a natural appearance, a circumstance which we have sometimes witnessed in the stumps of amputated limbs that have been fatally involved in the acute forms of the disease. It is clear, then, that osteo-myelitis may exist as an independent affection, at least so far as inflammation of the adjoining tissues is concerned, and it is in this sense that we shall employ the term.

During the late internecine strife in this country, this disease proved very destructive to our wounded soldiers, and was one of the chief causes of a fatal result in cases where the osseous tissue had been injured by gunshot projectiles, or surgical operations involving bone had been performed. It was by this circumstance that my attention was first called to and then fixed upon this disease. It was by this circumstance that I have been induced to devote some time to the study of its nature and relations.

On investigating the literature of the subject, I find that the disease now known by the name of osteo-myelitis is not a new thing. Cases and fragmentary accounts of said disease, under a considerable variety of names and appellations, have, from time to time, been placed on record by a considerable number of surgeons, commencing more than 150 years ago. *J. L. Petit* speaks of it in his Treatise on the Diseases of the Bones (anno 1705), in the chapter on exostosis, and presents it as one of the effects of those osseous tumors which, instead of growing out from the surface of the bone, are developed towards the medullary canal. *Duverney*, in a chapter where he treats of that form of fracture of the long bones which is sometimes called a fissure or split, relates three cases of it, one of which, especially, leaves no room for doubt with regard to its real character (Nélaton). In 1740, *Gooch* saw a patient having osteo-myelitis, which he has quaintly described as "A case in which the tibia was affected to an extraordinary degree, in a very short time, by a critical discharge of febrile matter upon a leg which had been fractured some years before." (Gooch's Surgery, vol. ii., p. 349.) *Cheselden* says: "Sometimes matter is formed in the large medullary cavities of the cylindrical bones, which, constantly increasing and wanting vent, partly by corroding and rendering the bone carious, and partly by pressure, tears asunder the strongest bone in a human body, of which I have seen several instances." (The Anatomy of the Human Body, by W. Ches-

elden, p. 40. London, 1778.) He refers to two cases which he had seen, but does not give the particulars. The celebrated English surgeon, *Hey*, reports two cases of suppurative osteo-myelitis, circumscribed in character, at considerable length, under the title of "Caries of the Tibia." An abscess formed in the medullary canal in both of them, which discharged its contents through a perforation or hole in the walls of the tibia made by nature, after the method called by some *spontaneous trepannation.* The first case occurred in 1786, in the person of a young lady from Richmond. The second in 1792, in a stout young woman aged 15. *Hey* did not amputate, but enlarged the opening in the walls of the bone already made by nature, and removed the diseased tissues lying within the bone. Both patients made good recoveries. (Hey's Surgical Observations, pp. 26 to 32. London, 1810.) *Percival Pott*, in a chapter devoted to "Separation or destruction of both tables of the skull from contusion," relates at least two cases of osteo-myelitis involving the diplöe; and while describing the inflammatory consequences of contusion of the cranium, he gives an excellent account of the symptoms produced by cranial osteo-myelitis. (Pott's Chirurgical Works, vol. i., p. 115 et seq. London, 1779.) *Abernethy* says: "Suppuration of the diplöe and the death of a portion of the bone are the common effects of injury done to the cranium, and such a morbid state may indeed occur at some distance of time from the receipt of the injury." (Surgical Observations, vol. ii., p. 69, American ed., 1811.) He here obviously speaks of cranial osteo-myelitis. *Hennen*, writing in 1817, alludes to this disease as it affects the long bones, under the name of abscess in the medullary canal, etc. (Principles of Military Surgery, pp. 100, 115, Am. ed.) In 1828, *Craigie* made the following statement in his book on pathological anatomy: "The medullary filamentous web is, perhaps, still more important than the periosteum in its morbid influence on bone. It is, in the first place, liable to inflammation; and accordingly as this takes place in the medullary web of the cylindrical bones, or in that of their epiphyses, or of the short irregular bones, different effects result" (p. 564). In 1831, *M. Reynaud*, a French surgeon, published a paper "On Inflammation of the Medullary Tissue of the Long Bones," in which he gives an account of five cases of that disease, all occurring in stumps after amputation performed for diseased conditions, and all terminating fatally. (Archives Générales de Médecine, tome xxvi., p. 161 et seq.) In 1833, *Mr. B. Phillips*, of Westminster Hospital, wrote a brief but excellent article "On Inflammation of the Medullary Membrane after Amputation" (London Medical

Gazette, vol. xiii., p. 189, November 9, 1833). In 1833, also, *Dr. Carswell* gave a picture representing inflammation of the medullary canal of the femur (Illustrations of the Elementary Forms of Disease, 4to). *Cruveilhier* evidently alludes to cases of osteo-myelitis, although he does not use that term, while discussing the subject of "Phlebitis and Visceral Abscesses," in his "Pathological Anatomy of the Human Body" (tome i., liv. xi, p. 10). In 1844, *Nélaton* gave a brief account of that disease, following closely the paper of Reynaud. He also employs the term osteo-myelitis (Éléments de Pathologie Chirurgicale, tome i., p. 595 et seq.) Jules Roux says this term was devised by Nélaton in 1834. It has, therefore, been a long time in use (32 years), although it is the recent designation of the disease. (Mémoires de l'Académie Impériale de Médecine, tome xxiv., p. 553.) In 1849, *Mr. Stanley* wrote about it in a very interesting way, and narrated seven cases, under the title of "Suppuration in Bone" (*vide* A Treatise on Diseases of the Bones, etc., etc., p. 48 et seq., American ed.) In 1855 a valuable memoir on osteo-myelitis, written by *Dr. T. Vallette*, a French military surgeon, was published in the "Récueil de Mémoires de Méd. et de Chirurg. Militaires," a publication which annually emanates from the French Minister of War. *M. Vallette* describes the disease as he saw it in the Crimean war, at one of the large military hospitals of Constantinople, among the wounded brought directly from the battles of Alma and Inkermann. The disease appeared in an acute form, and proved very destructive to life. In a work "On Suppuration and Surgical Drainage," published in 1859, *M. Chassaignac* devotes 31 pages to an excellent discussion of osteo-myelitis, as it occurs spontaneously in civil life, and unconnected with wounds or surgical operations involving bone, in which he gives a full account of four cases observed by himself. In 1860 a long and very interesting memoir upon traumatic osteo-myelitis, written by *Dr. Jules Roux*, and presented to the Imperial Academy of Medicine at Paris, was published in the transactions of that body. (*Vide* Mémoires, etc., p. 537 et seq.) *M. Roux* had charge, in 1859, of the Naval Hospital of St. Mandrier at Toulon, into which he received about 2,000 wounded from the battle-fields of the Italian campaign of that year. He saw and described the disease under its chronic conditions, that is, after it had existed for a considerable time. In 1860, after the presentation of M. Roux's memoir to the Academy, osteo-myelitis was the subject of discussion at two successive sittings of that body. It was also the theme of an elaborate discourse by *Baron H. Larrey*, the distinguished surgeon-in-chief of the French army in the Italian

campaign, and the subject of a letter to the Academy from *M. Legouest*, the distinguished surgeon of Val-de-Grace. In short, M. Roux's memoir appears to have produced a very deep impression upon that assemblage of learned men. *Mr. Longmore* read a valuable paper on osteo-myelitis before the Royal Medical and Chirurgical Society, Feb. 28, 1865, an abstract of which was published in the *Medical Times and Gazette*, March 11, 1865. (*Vide* American Journal Medical Sciences, July, 1865, p. 230 et seq.) But the various systematic treatises on surgery in use in both Europe and this country contain either no account at all, or only a very meagre one, of this important disease.

In reviewing the literature of the subject, we are struck by the fact that it is only within the last dozen years that osteo-myelitis has fairly begun to attract the attention which its importance demands. The cause of surgical science owes much to Drs. T. Vallette and Jules Roux for bringing prominently forward their own observations concerning this very destructive disease, as it appeared in the Crimean and Italian campaigns respectively. The experience of those two wars, together with that of our own fratricidal strife, has shown conclusively that osteo-myelitis occurs much more frequently in military practice than has hitherto been generally supposed; and I believe that testimony is now accumulating which tends to prove that this disease occurs in civil practice, also, much oftener than has heretofore been imagined. Its existence explains the want of success which oftentimes attends surgical operations involving bone—operations undertaken for the removal of disease as well as for the relief of injury, and occurring in civil as well as in military practice.

Indeed, the physiological and pathological importance of the medullary tissue has, for the most part, been overlooked until a very recent period. It is only of late years, and since the aid of the microscope has been secured in prosecuting the study of histology, both healthy and morbid, that the importance of the medullary tissue to the well-being of the bones has been sufficiently recognized. Formerly the marrow in the canals of the long bones appears to have been looked upon as a tissue analogous in every respect to the tela adiposa, and as a matter of quite secondary importance, so far as the pathological processes in bone are concerned

I have thus sketched the historical features of our theme at considerable length, because by so doing we get broader views of the subject, and are enabled to perceive the development of ideas and the progress of knowledge concerning it. In 1831 the memoir of M. Reynaud ap-

pears to have fallen coldly upon the medical mind of France. In 1860 the memoir of M. Jules Roux, on the same subject, excited a very lively interest in even the staid Academy of Medicine at Paris. Thus we behold progress in the midst of even the conservatism of traditional medicine. I have done this also for the purpose of showing that inflammation of the medullary tissue is not a new-fangled notion, but a disease which, under various appellations, has been known for a long time; and that it is not an affection of rare occurrence, but one which is frequently met with and as frequently recognized, if the examination, whether clinical or post mortem, be sufficiently thorough and complete.

Since the anatomical distribution of the medullary tissue is such that it may be found in greater or less quantity in every bone[1] of the body, it follows that osteo-myelitis may occur in any bone of the body. It has, indeed, been met with in several of the cranial bones, in the upper jaw, in the lower jaw (Prof. Clark, a distinguished Fellow of this Academy, has seen two examples wherein this bone was affected), in the sternum, ribs, humerus, radius, ulna, carpus, os innominatum, sacrum, femur, tibia, fibula, patella, and the bones of the tarsus, by various observers. The disease, however, occurs much more frequently in the lower than in the upper extremity, obeying, in this respect, the general law concerning the development of disease in different parts of the body.

Varieties of Osteo-Myelitis.—The clinical history of this disease exhibits a wide diversity with respect to intensity and duration. In some cases its severity is very great, and it runs through its whole course in a few days, while in other cases its progress is sluggish and obscure, requiring not unfrequently several weeks or even months to attain a full development. Inflammation of the medullary tissue of bone may, on the one hand, be ranked among the most rapidly destructive of all the inflammatory disorders with which we are acquainted, while, on the other hand, it appears to be allied to those that are exceedingly slow in their march. There are but few parenchymatous inflammations which destroy life more speedily than acute suppurative osteo-myelitis, and there are none which are slower in their progress than chronic abscess of bone. For the purposes of clinical study and

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[1] *Robin* says: "Marrow is found in all the bones of the body, and it extends through the vascular canals as far as the periosteum." Indeed the medullary tissue is not only distributed widely, but is also abundant in quantity. It fills the canals of the long bones, the cancelli of their epiphyses, and of the short and irregularly shaped bones in general, the diploë of the cranium, and the medullary spaces in every part of the osseous system.

description, and likewise for the development of certain practical considerations connected with the treatment, it will be found convenient to recognize at least *two varieties of osteo-myelitis*, namely, the *acute* and the *chronic*. But, at the same time, it should not be forgotten that this classification, although it is founded upon differences which actually exist in nature, is, in reality, artificial; that cases of this disease, in respect to two of their elements—intensity and duration—form a graduated series, represented at one end of the scale by the most acute and at the other by the most chronic cases; that in the middle of this descending series it is difficult to say whether some of the cases belong to the acute or to the chronic class, and that the inflammatory process is essentially the same in both varieties, so far as the marrow is concerned.

The following case presents a good example of acute inflammation of the medullary tissue following amputation, as it appeared in our army hospitals during the late war.

A CASE OF ACUTE OSTEO-MYELITIS.

Private HENRY STUBBLEBINE, Co. C, 9th Pa. Vols., aged 20, and of sound constitution, was brought to Stanton Hospital, May 8th, 1863. He had been wounded in the battle near Fredericksburg, Va., five days before (May 3d, 1863), and on that account had suffered primary amputation of the left thigh at the lower third by the circular method.

When he came to the hospital his general condition was good; a water dressing was applied to the stump, and, his bowels being constipated, a dose of ol. ricini was administered.

May 11th. Oozing of blood from the stump was observed. The stump also had appeared to be swelled (distended) ever since he was admitted to the hospital. It was opened and found filled with coagulated blood, which was removed. It was left open to heal from the bottom by granulation, and to prevent any possible accumulation of pus in its interior.

May 15th. Suppuration free and laudable in quality; granulations healthy; the stump is also contracting. He continued to do well till

May 27th. Has passed a restless night, and complains of a good deal of dull pain in the stump, which he refers to the bone; has no febrile symptoms; ordered morph. sulph. in full doses.

May 28th. The pain continues, but is more severe; pulse quick; skin hot and dry; pus oozing from the sawn end of the bone in the stump (osteo-myelitis); stump swelled; secretion of pus diminished; prescribed potass. iodid. ℈j., dissolved in aqua camphor. f℥iv., to take

a tablespoonful every four hours, and stimulants. In the afternoon he had a chill.

May 29th. Was slightly delirious; had rigors and hot flushings at irregular intervals; was rapidly becoming debilitated; same treatment continued.

May 30th. Delirium increased; skin yellow; pulse 130, and very feeble; continued in about the same condition till

June 2d, when he died.

The stump was examined after death, and a number of small abscesses were found in the muscular tissue of it. Pus was also found in the medullary canal of the femur, forming numerous little collections, varying in size from a mustard seed to a pea. The internal organs were not examined, as his friends were waiting to remove his body from the hospital.

Comments.—This is a strongly marked instance of acute osteo-myelitis. The following are the essential points pertaining to it. A healthy young man of 20 years sustained primary amputation of his left thigh for gunshot injuries. He seemed to do well for a period of 24 days. Then symptoms of osteo-myelitis appeared in the stump-bone. Of these symptoms the first was a dull aching pain in the stump, which the patient referred to the bone. This pain was severe enough to deprive him of sleep. The next day the pain was still more intense, and he now had constitutional disturbance in the shape of irritative fever. At the same time the stump became swelled, and the flow of pus from it diminished in quantity and depraved in quality, showing that the soft tissues of the stump sympathized with the inflammatory mischief which had been lighted up in the medullary tissue of the bone, or, speaking more exactly, that the inflammatory process had spread from the marrow to the soft parts lying exterior to the bone. Pus was also seen oozing out from the marrow at the end of the stump-bone. This occurrence established the diagnosis of osteo-myelitis beyond a doubt. On the next day (the third after the appearance of inflammation of the medullary tissue) his symptoms were all worse. He was beginning to be delirious, and his strength was failing rapidly. He also had rigors alternating with hot flushings and occurring at irregular intervals. The last group of symptoms belongs to pyæmia. On the next day (the fourth) he was still more delirious and still more debilitated His skin had now assumed a yellowish hue, and the symptoms of pyæmia were still more pronounced. He continued to grow worse, and died on the seventh day after the symptoms of osteo-myelitis made their appearance. The inflammation

of the marrow was suppurative in character, and it is worthy of special notice that in the short period of three days it was attended by signs of general purulent infection. It is probable that an examination of the internal organs would have revealed visceral abscesses.

The succession of pathological events in this case is clearly defined. The patient did well for more than three weeks, then his stump was attacked with suppurative osteo-myelitis, and pus was seen oozing from the marrow at the end of the bone. In a few days symptoms of purulent infection made their appearance, and a few days later still he died of pyæmia. The focus of suppuration from which the system became infected in this case was obviously located in the medullary tissue of the stump-bone.

The cases of osteo-myelitis reported by *Hey*, under the name of "Caries of the Tibia," to which reference has already been made, present examples of the chronic variety of the disease.

Cases of *chronic osteo-myelitis* were very often met with in our military hospitals during the late war. The disease manifested itself in this form mainly in the stumps of amputated limbs, and in gunshot fractures which were being treated conservatively. Chronic inflammation of the medullary tissue of the stump-bones was generally accompanied by necrosis and exfoliation of the dead bone. At the same time the portion of bone that did not perish became more or less thickened in most instances, by the formation of laminæ of new osseous tissue around the exterior (periostosis). The Army Medical Museum at Washington contains a great number of specimens of necrosed bone that have been extracted from stumps in cases of chronic osteo-myelitis. Such patients generally made good recoveries.

Causes of Osteo-Myelitis.—The time at our disposal will permit us to state in this place, concerning this topic, but little besides the conclusions to which we have been led by our investigations.

1. Osteo-myelitis is not unfrequently produced by *contusion and contused wounds of bone.* Pott and Abernethy have abundantly shown that contusion of the cranium often occasions suppuration in the diplöe. The writer published, in the *American Journal of Medical Sciences* for July, 1865, several cases of contused wounds of the long bones inflicted by gunshot projectiles, wherein destructive inflammation of the medullary tissue had been produced. Indeed, the chief source of the great danger to life which attends contusion and contused wounds of bone, arises from the inflammation of the medullary tissue, which is very apt to be kindled thereby.

2. Osteo-myelitis is not unfrequently occasioned by *compound frac-*

ture, especially gunshot fracture, of the long bones. In such cases the inflammation of the marrow appears to be due, not only to the injury it has sustained, but to the admission of air also.

3. This disease has been produced by the operation of *resection*, or the excision of a portion of a bone. Of this I have seen several instances.

4. Osteo-myelitis often follows the performance of *amputation*, especially the major amputations, in both civil and military practice. This has been witnessed by Reynaud and Phillips, by Vallette, Pirogoff and Roux, and by our own army surgeons during the late war. The first two made their observations exclusively in civil practice.

5. *Foreign bodies*, such as a bullet, a piece of clothing, or a fragment of bone when driven into and lodged in the medullary canal of a long bone, have been known to produce fatal osteo-myelitis. Of this I saw a fatal instance not long since in civil practice. The foreign body was a fragment of bone.

6. The *scrofulous dyscrasia* may induce inflammation of the medullary tissue. Stanley relates two cases belonging to this category. At least one of Chassaignac's cases also was probably occasioned by struma.

7. *Constitutional syphilis* sometimes occasions osteo-myelitis. *Percival Pott*, admitted by all to have been a very acute observer, states that in cases of syphilitic necrosis of the cranial bones the disease has its seat in the diplöe, or, in other words, in the medullary tissue. *Mr. B. Phillips* and *Langston Parker* have reported cases of syphilitic osteo-myelitis occurring in the long bones of the lower extremity, especially the tibia.

8. The *rheumatic diathesis* sometimes appears to be concerned in the production of osteo-myelitis; or, in other words, we have not only a rheumatic periostitis and a rheumatic ostitis, but also a rheumatic osteo-myelitis. In one of Stanley's and one of Chassaignac's cases the disease seems to have had a rheumatic origin. Dr. Hermann Klose, of Breslau, has given an account of thirteen cases of what appears in reality to have been osteo-myelitis, under the unique title of *Meningo Osteo-Phlebitis* (*vide* Archives Générales de Médecine, for August and November, 1858). Dr. Klose distinctly recognizes the idea that the disease may have a rheumatic origin.

9. *Idiopathic fever* is occasionally followed by osteo-myelitis. Indeed, this occurrence took place in one of Hey's cases, and he makes the following remarks concerning it: "Upon a review of the case I am inclined to think that an abscess was formed within the tibia, in conse-

quence of the fever which she had in May, 1786. During the continuance of the fever she had no particular pain in her leg; but upon the decline of the fever the pain commenced, and continued violent for six weeks. It seems probable that during this time the matter was making its way through the anterior lamella of the tibia; and that the pain abated soon after the matter had perforated the bone; for it ceased immediately on the appearance of a tumor on the shin" (op. cit., p. 26 et seq.)

10. Osteo-myelitis sometimes occurs *without apparent cause*, of which Stanley has related two instances.

11. The *transportation of the wounded*, in military practice, is often attended with unavoidable injury of such a nature as to assist not a little in the production of osteo-myelitis among such of the wounded as have sustained an injury of the osseous tissue. For example, in cases of gunshot fractures of the long bones of the lower extremity, the jolting incident to ambulance transportation causes the soft parts to be pierced and lacerated by the sharp ends of the broken bone, and sometimes it happens that a fragment of comminution is driven into the medullary canal. Again, in cases where the thigh has been amputated, the jolting causes the soft parts of the stump, but more especially the flaps, to be bruised against the bone, in consequence of which they become more or less inflamed. Now, this traumatic inflammation may spread to the medullary tissue, and kindle in it a suppurative inflammation of a fatal character. However, it seems to be well established, whatever the explanation may be, that, other things being equal, the wounded who are treated on or near battle-fields suffer a much smaller loss from osteo-myelitis than those who are transported to distant points for surgical care.

12. This disease is much aggravated by *impure air, especially the foul air of imperfectly ventilated or uncleanly hospitals.* This is probably one of the most prolific of all the causes of osteo-myelitis, and since it is in great measure a preventible cause, it should claim our earnest attention. Observation has shown that, other things being equal, the wards of a hospital that are most impure in respect to their atmospheric condition generally furnish the largest proportion of fatal cases of osteo-myelitis. Observation has also shown that surgical patients—for example, those who have sustained gunshot fracture, or amputation, and are treated in the portions of a ward where the air is most likely to stagnate, for example, the corners—are considerably more liable to become affected with destructive osteo-myelitis than those who are treated in other portions of the same ward, where the air is

more free from impurities. Observation has further shown that surgical patients treated in hospital tents, if they are properly pitched and policed, are much less likely to be seized with fatal osteo-myelitis than a similar class of patients treated in the wards of a hospital building. It is probable that, under the depressing and poisonous influence of foul hospital air, cases of inflammation of the medullary tissue which, under favorable circumstances, would eventuate in recovery, degenerate into the stage of suppuration, and perhaps a foul suppuration at that, and sooner or later purulent infection is produced which occasions death.

Osteo-myelitis is also pre-eminently a disease of *youth*. Of 72 cases, the notes of which have been preserved, that occurred under my observation in military practice, the ages were as follows: between 18 and 20, seven; between 20 and 25, twenty-four; between 25 and 30, seventeen; between 30 and 35, thirteen; between 35 and 40, six; between 40 and 45, three; between 45 and 49, two. Sixty-one of them were less than 40 years of age, and only eleven older than that. The youngest case was 18 and the oldest 49. But it may be justly objected against statistics of this sort, which are drawn from military sources, that, in respect to age, soldiers do not represent the average of the population, since neither the very young nor the aged are enrolled in the army to any considerable extent. I have therefore collected, from various sources, 36 cases of osteo-myelitis that occurred in civil practice, which are not open to the objection mentioned above. An analysis of their ages yields the following results: between 10 and 15, five; 15 and 25, fourteen; 25 and 35, five; 35 and 45, one; 45 and 55, two; 55 and 65, one; 65 and 75, one; and in seven instances the age was not stated. It will thus be seen that of the 29 cases whereof the ages are given, 19, or about two-thirds, were less than 25 years old, and that in only five instances were the subjects more than 35 years of age. The youngest case was aged 11, and the oldest 70 years.

Furthermore, osteo-myelitis is pre-eminently a disease not only of the period of youth, but also of the *male sex*. Of the 36 cases mentioned above as occurring in civil practice, 27 were males, 8 females, and in one instance the sex was not stated.

Pathological Anatomy of Osteo-Myelitis.—The morbid conditions of the marrow, in respect to structure, which are produced by the inflammatory process, are three-fold: 1st, *carnification* or *hepatization;* 2d, *suppuration;* and, 3d, *gangrene.*

1st. *Of the carnified or hepatized marrow.*—The medullary tissue in

the long bones of the adult, when healthy, is loaded with fat, and on that account presents a pale yellow color. Among the first effects of the inflammatory process upon this tissue are a reddening of its hue and an increase of its density and tenacity. The color of the marrow during the first stage of osteo-myelitis varies from coppery red to crimson, to brown, and almost to black. In this form the inflamed marrow is said to be *carnified* or *hepatized*, on account of the resemblance in appearance which it is supposed to bear to red muscular tissue or flesh, on the one hand, and dark red or reddish brown hepatic tissue, on the other. The inflammatory process produces this change in the color of the medullary tissue by the following means:

1. By diminishing the quantity of the fat, to which the yellow hue of the healthy adult marrow in the long bones must be ascribed.

2. By increasing the quantity of one of the cellular elements of the medullary tissue, namely, the marrow cells, which, under such circumstances, are more or less granular, and resemble closely, if they are not identical with, what were formerly called exudation cells.

3. By increasing the quantity of blood contained in the inflamed tissue, thus producing an active hyperæmia, which is proved by the fact that the inflamed marrow bleeds readily on touching it.

When the carnified marrow has a yellowish red or a copper colored hue, it is because fat vesicles, in considerable quantity, still constitute one of its histological elements. As muscular tissue acquires a yellowish tinge from undergoing the fatty degeneration, even so the inflamed marrow may retain some of that tint, because the oil has not been sufficiently expelled from it by the inflammatory process. Other things being equal, the greater the proportion of oil contained in the inflamed marrow, the deeper the yellowish tinge is found to be. But even when the carnified or hepatized marrow has a deep red or brownish hue, the examination of it with the microscope shows that, although the proportion of fat vesicles is very much reduced, still the fat has not entirely disappeared, provided the specimen examined belongs to an adult, and has been taken from a long bone. Such, at least, have been the results of our own observations.

The extent to which the quantity of blood in the inflamed marrow is increased above the healthy standard, or, in other words, the amount of the congestion, has also an important bearing upon the morbid coloration of the medullary tissue.

What occasions the increase in density, consistence and tenacity which characterizes the carnified or hepatized marrow?

It seems to be produced, at least to some extent, by the develop-

ment, under inflammatory irritation, of a rudimentary fibrous material, represented, when examined under the microscope, for the most part, by elongated and spindle shaped fibre-cells. But this new growth of fibrous tissue has generally appeared to me to be quite insufficient in quantity to account satisfactorily for the amount of the increase in the density and consistence of the diseased marrow, and I have therefore been compelled to seek some other cause which may assist in producing it. Such a cause is probably constituted by *sclerosis* of the intercellular substance—or, in other words, *sclerosis* of the substance which lies between the free marrow-cells and connects them together. The induration of the intercellular substance, in such cases, appears to be a part of the inflammatory process, and to depend upon the grade or degree of the inflammatory irritation. For if, from any cause, the intensity of the inflammatory irritation be sufficiently increased, the intercellular substance will soften and liquefy; there will also be a very rapid production or proliferation of the cells, and suppuration will be established—or, in other words, the carnified medullary tissue will be directly transformed into pus through the agency of a high grade of inflammatory irritation.

2d. *Of suppuration of the marrow.*—Carnification or hepatization appears to be the result of the *first* stage of inflammation of the medullary tissue, and suppuration to be the result of the *second* stage of that disease. Before the marrow suppurates it always undergoes the process of carnification or hepatization. Hence it happens that the abscesses produced by suppurative osteo-myelitis in the shafts of the long bones are surrounded by carnified or hepatized medullary tissue. Hence it also happens that, as these abscesses increase in size, it is constantly done at the expense of the carnified or hepatized tissue, and by its transformation into purulent matter in the way just pointed out. We say, again, that the transformation of new medullary growths into pus is attended by the following phenomena: the granular medullary cells multiply themselves with very great rapidity, and become still more granular. At the same time the intercellular substance softens and finally liquefies, the marrow-cells become converted into pus corpuscles, and the intercellular substance into *liquor puris*, or the liquid intercellular material of purulent matter. Some of our own observations strongly corroborate these views of Virchow. We say, then, that carnification or hepatization and suppuration of the medullary tissue are successive stages in the transformations of the histological elements of that tissue which are produced by the inflammatory process. Hence it comes to pass that we not unfrequently find in

stump-bones affected with osteo-myelitis the marrow in a state of suppuration at the lower end where the morbid process began, and above that in a state of carnification or hepatization.

3d. *Of gangrene of the marrow.*—One grade of inflammatory irritation produces carnification or hepatization of the medullary tissue, another grade suppuration, and a still higher degree of inflammatory irritation produces gangrene of that tissue. When the marrow mortifies, its color usually becomes very dark, or nearly black, and it emits an offensive, gangrenous odor. When the mortified medullary tissue is examined with the microscope, it is found that all the cell structures are destroyed, that all the fat vesicles are broken up, and the oil which they contained is set free. The fibres of connective tissue, however, may withstand the putrefactive process for some time, and we therefore generally find the gangrenous marrow to consist of connective tissue, free oil and granular matter—all stained with decomposing hæmatoidin.

Robin mentions a pathological condition of the marrow which is closely allied to gangrene, and has an important bearing on the prognosis of the case in which it occurs. I have seen it several times, and I doubt not that it has attracted the attention of most surgeons. He says: "In some conditions the inflammation of the marrow becomes so intense that the medullary cells cease to receive materials fit for their continuous molecular renovation. *The marrow then softens and becomes liquid, and flows from the extremity of the fractured or amputated bone.* When this liquid is examined, there are found in it only molecular granules in suspension, sometimes nucleated medullary cells, and always drops of oil, for the liquefaction melts down the walls of the fat vesicles and sets the oil free. This is always a grave occurrence, as has been demonstrated in the study of fractures, especially those of the long bones, and in certain other pathological conditions, such as amputation followed by so-called purulent infection." (*Vide* American Journal Medical Sciences, October, 1865, p. 498 et seq.)

We sometimes find all three of the pathological conditions of the marrow which may be produced by the inflammatory process present in the same specimen. Thus, I have seen a stump-bone affected with osteo-myelitis, in the lower part of which the marrow was gangrenous; above that, in the stage of suppuration; and still higher up, in the stage of carnification or hepatization.

Symptoms and Diagnosis of Osteo-Myelitis.—The first sign which announces that the medullary tissue has been attacked by inflammation is, for the most part, local pain. It usually appears to the patient

to be situated in the bone at the place where the marrow is diseased. It varies much in character and intensity in different cases. In some instances it seems to be dull, heavy and aching; in others it appears to be gnawing; and in still other instances it is very acute in character. Sometimes it is but slight in degree, while in other cases it is very intense. Occasionally, however, it is not present, or at least the patient, when asked if he has pain, always replies in the negative. This circumstance, in some cases, appears to be due to the hebetude of typhoid disease, in others to extreme debility, but in other instances cannot be accounted for in the present state of our knowledge of the subject.[1]

To the local pain is generally superadded local swelling as a symptom of osteo-myelitis, which appears not immediately, but after the lapse of a period varying from a few hours to several days, or even weeks, in duration. The tumefaction is usually more or less indurated in feel, puffy in appearance, and pits under pressure. It is generally more or less flattened in shape and coextensive with the suppuration of the medullary tissue lying beneath it, at a line corresponding with the boundaries of which it usually terminates abruptly. The "puffy tumor" of Pott affords a good illustration of the various features which characterize the swelling of the soft parts produced by osteo-myelitis.

When this disease invades the stumps of amputated limbs it is generally found that carnified or hepatized medullary tissue protrudes from the canal at the sawn end of the bone, and after the lapse of a few days pus will not unfrequently be seen exuding *guttatim* from this portion of the inflamed marrow.[2] Furthermore, as the stump becomes

[1] The pain produced by osteo-myelitis is more likely to be intense if the disease involve a bone whose continuity has not been destroyed by amputation, resection, or fracture. Thus I have seen a case of osteo-myelitis of the tibia, which was caused by a contused wound of that bone wherein the pain was very severe —almost agonizing. In some cases of inflammation of the medullary tissue of fractured and likewise of stump-bones that have come under my observation, the pain was slight, apparently because the purulent matter could readily escape from the medullary canal.

Again, the pain which accompanies osteo-myelitis is generally very intense if the neighboring osseous tissue also is inflamed; for in such case there is superadded to the pain pertaining to the inflammation of the medullary tissue that which is produced by the ostitis.

[2] If the marrow liquefies and the fat vesicles burst on account of the intensity of the inflammation, as pointed out by *Robin*, then free oil will be found flowing out of the medullary canal at the end of the stump-bone in a case of amputation, or from the wound of the soft parts mixed with purulent matter in a case of compound fracture.

tumefied in consequence of inflammation of the medullary tissue of its bone, the purulent discharge from its granulating surface generally exhibits considerable alteration. It usually becomes considerably diminished in quantity, and thin, flaky and serous in quality. Sometimes it becomes changed to a scanty quantity of bloody serum. Occasionally it is completely arrested, and the stump presents a dry and pork-like appearance.

When acute osteo-myelitis invades the cranium or any of the limbs, in their continuity, a collection of purulent matter is not unfrequently formed in relation with the exterior of the bone at the seat of the disease. Now, on incising this abscess the matter, as it flows away, will often be found to contain numerous oil globules. This circumstance denotes that the disease is either acute osteo-myelitis or acute periosteal abscess, and is of great value in a diagnostic point of view. Chassaignac asserts that the sub-aponeurotic pus in cases of osteo-myelitis is *always* mixed with oil globules. While I am not prepared to yield full assent to this statement, I am ready to say that I am fully satisfied from my own experience that the sub-aponeurotic pus of osteo-myelitis is *very often* mixed with oil globules.

The only diseases which are likely to be mistaken for acute osteo-myelitis are *acute periosteal abscess* and *diffuse cellulitis* or *phlegmonous erysipelas.*

With regard to the diagnosis of osteo-myelitis itself, irrespective of any other disorder, we have to say that the only signs which can be properly considered as pathognomonic of that disease, are the reddened and sclerosed or hepatized appearance of the marrow, with, perhaps, some drops of pus exuding from it, which are sometimes detected by ocular examination. But the clinical observation of these signs is practically restricted to the cases wherein osteo-myelitis follows amputation, with the addition, perhaps, of some instances of resection. Now, in view of the great value of these signs, and in view of the great danger which always attends acute suppurative osteo-myelitis, it is advisable for the surgeon to open the stump sufficiently far to permit him to ascertain the condition of the marrow at the sawn end of the bone, in every case where there is good reason to suspect the presence of the disease in that form.

But with regard to osteo-myelitis produced by compound fracture, by contusion, by scrofula, by syphilis, by rheumatism, and indeed by any cause besides amputation, there are no individual symptoms of which the surgeon can avail himself that can be considered as diagnostic of the disease, especially so far as the long bones of the extremities

are concerned. In cases of cranial osteo-myelitis, however, the "puffy tumor" of Pott may be considered as characteristic of the affection.

Osteo-myelitis affecting the bones of the extremities can generally be distinguished from *phlegmonous erysipelas* by attending to the following points: 1st, the pain produced by the former is usually much more severe than that occasioned by the latter disease; 2d, the character of the pain is different in the two diseases, that of osteo-myelitis being mostly of an aching and gnawing character, and that of phlegmonous erysipelas being throbbing and burning and much less intense; 3d, the swelling produced by phlegmonous erysipelas is more boggy than that occasioned by osteo-myelitis; 4th, the swelling produced by the former differs considerably in shape from that occasioned by the latter disease; the tumefaction resulting from osteo-myelitis terminates by an abrupt rim or border which corresponds with the boundaries of the suppurating portion of the marrow, but the swelling occasioned by phlegmonous erysipelas does not terminate in that way, since it usually sinks down gradually until it is lost in the surrounding parts; 5th, if an explorative incision be made to sufficient depth it will be found that the sub-aponeurotic pus does not contain oil globules in cases of phlegmonous erysipelas, while it generally does contain oil globules in cases of osteo-myelitis; 6th, if evacuative incisions be made to a sufficient extent they will afford great relief from the pain and distress in cases of phlegmonous erysipelas, but not in cases of osteo-myelitis.

The last named can oftentimes be distinguished from the first named disease by the shape of the swelling alone, which in osteo-myelitis terminates by an abrupt rim or border corresponding with the limits of the suppuration of the medullary tissue, and in phlegmonous erysipelas does not terminate in that way.

Osteo-myelitis can be distinguished from *acute periosteal abscess* by the following circumstances: 1st, in acute periosteal abscess fluctuation precedes puffiness in the swelling, in osteo-myelitis it is just the contrary (Chassaignac); 2d, the painful œdema which accompanies osteo-myelitis terminates abruptly by a projecting and hard brim, just at the height where the bone ceases to be diseased (Chassaignac); 3d, osteo-myelitis may be accompanied by suppurative inflammation of the periosteum and diffuse inflammation of the cellular tissue; the acute periosteal abscess occasions neither medullary suppuration of the bone nor purulent infiltration of the limb (Chassaignac); osteo-myelitis spreads from one bone to another, in direction upward and toward the root of the limbs; the acute periosteal abscess generally remains

confined to the part of a limb in which it appeared (Chassaignac); 5th, if evacuative incisions are made in cases of acute periosteal abscess, they generally afford much relief from pain and distress; not so, however, in cases of osteo-myelitis.

Again, acute suppurative osteo-myelitis may sometimes be distinguished from acute periosteal abscess by still another sign, one that is founded on the condition of the bone that underlies the suppurating periosteum, which is generally necrosed in such cases, and oftentimes to great extent. Now, if the death of the bone has been occasioned by osteo-myelitis, and the suppuration of the periosteum and the neighboring parts be secondary in character, and produced by extension of the inflammatory process to them from the diseased marrow, then the surface of the dead bone is apt to present a rough, eroded, or worm-eaten appearance, occasioned by the adhesion of living particles of osseous tissue to the periosteum at the time of its separation from the dead osseous tissue; but if the necrosis be occasioned primarily by diffuse periostitis, then the surface of the dead bone is found to be comparatively smooth—the longitudinal furrows are, perhaps, somewhat deeper and wider than natural, but the circumferential laminæ are not eroded.

If there be any doubt concerning the diagnosis as between osteo-myelitis, acute periosteal abscess, and phlegmonous erysipelas, it is generally advisable to make an explorative incision down to the bone, for the purpose of gaining such information as will settle the question definitely; for even extensive incisions made in such cases do not do harm, but, on the contrary, usually prove beneficial.

If for any reason it be deemed inexpedient to make explorative incisions for the purpose of verifying the diagnosis, much valuable information may, not unfrequently, be obtained by using the exploring needle, in cases where the periosteum is detached and separated from the bone by a quantity of pus. If, in such a case, the needle be thrust into the swelling in a direction towards the bone, and it be attempted to move it in circular sweeps, an equable resistance will be found as long as it remains in the soft parts; but if it be thrust down to the bone, and then drawn back a little (about a line), its point may be turned in any direction. (Barwell.)

If, when purulent matter has been withdrawn from deep-seated parts, either by incision, or through an exploring canula, or by spontaneous discharge, there be doubt as to whether its production is dependent upon disease of the osseous tissue, the question may not unfrequently be put to rest by finding in the pus particles of disintegrated bone,

resembling fine sand, which, on examination with the microscope, are found to contain lacunæ, canaliculi and Haversian canals; and by finding in the purulent matter, on the application of chemical tests, the calcareous salts belonging to bone, in at least considerable quantity.

But, while endeavoring to establish the diagnosis in an acute case of suspected osteo-myelitis, it is a matter of the first importance not only to interpret each symptom with rigidity, but also to consider the *tout ensemble* of the morbid phenomena, or to give attention to the symptoms as a whole, and while so doing the method of exclusion may be advantageously employed. If all the symptoms can be satisfactorily accounted for on the hypothesis that the disease is osteo-mylitis, and not by any other hypothesis, then it is certain that the case consists of that disorder.

The diagnosis of *chronic osteo-myelitis* is, in general, not difficult to make. The clinical history of the case, the length of time it has lasted, the order in which the morbid phenomena have been developed, the bone pain, the heat, the swelling, together with the suppuration of the soft parts—and in patients who have previously suffered a solution of the continuity of the diseased bone, either by fracture, or resection, or amputation, the occurrence of necrosis with the development of new osseous tissue from the periosteum and from the portion of the bone that did not lose its vitality, which, for the most part, can be readily ascertained—the persistent suppuration of the parts contiguous to the sequestrum, resulting from the mechanical irritation occasioned by its presence, and perhaps the exfoliation from time to time of fragments of necrosed bone, do not leave us long in doubt with regard to the real nature of the disease.

TERMINATIONS, COMPLICATIONS AND CONSEQUENCES OF OSTEO-MYELITIS.—Here time permits us to state but little more than the results of our investigations. It forbids us to relate in detail the cases, the pathological researches and arguments upon which our conclusions are founded.

1st. Osteo-myelitis, even when acute, not unfrequently terminates in *recovery by resolution*. Of this I have seen two notable instances. In such cases the inflammatory irritation subsides, the symptoms which indicate to the clinical observer the presence of the inflammatory process in the marrow disappear, and the diseased tissue is gradually restored to a healthy condition, without the intervention of suppuration. But the acute variety of the disease much more frequently degenerates into a chronic form, which is, for the most part, susceptible of relief by surgical means.

2d. Osteo-myelitis often occasions *central necrosis.* The Army Medical Museum at Washington contains a large number of specimens belonging to this category. When the disease affects the shafts of the long bones, the internal laminæ—that is, the laminæ which lie next to the marrow—may become necrosed, or, in other words, affected with dry gangrene (for necrosis is in reality dry gangrene of the osseous tissue), by being deprived of an adequate supply of blood because of the morbid condition or destruction of the medullary tissue. When the disease affects the epiphyses of the long bones, it may occasion necrosis of a portion of the cancellous structure; indeed, it may destroy the vitality of any part of the osseous structure which lies within the shell formed by the external layers of compact tissue.

3d. The inflammatory process may spread from the marrow to the osseous tissue and periosteum, and thus occasion necrosis of the whole thickness of the bone, or *necrosis in totality.*

4th. Osteo-myelitis not unfrequently produces *pyarthrosis.* In fifty-one cases of said disease, suppurative arthritis is known to have occurred in five instances. As already stated, inflammation of the medullary tissue exhibits a strong tendency to travel upwards from one bone to another towards the root of the limbs, and in this way invades the neighboring or intervening articulations. Thus, when the disease commences in the bones of the tarsus, it not unfrequently occasions pyarthrosis of the ankle; when it begins in the tibia, and spreads upwards, it produces pyarthrosis of the knee; and when it originates in the femur it often occasions pyarthrosis of the hip. Oftentimes the morbid process appears to enter the joint by perforating the cartilage of incrustation, which then contains a number of small, reddish colored holes that look as if they had been made with a punch. In the specimens I have examined, the cancelli underlying these holes were found to contain purulent matter, that is, matter containing pus corpuscles.

5th. Osteo-myelitis may occur simultaneously in more than one bone. Stanley and Chassaignac have each reported a case. The writer, also, has seen one instance.

6th. Osteo-myelitis very often occasions the *development of new osseous tissue,* which may be formed either in connection with the medullary tissue, when the new bony growth is called *endostosis,* or in relation with the periosteum, when it is called *periostosis,* or in the connective tissue of a limb, when it is known by the name of *osteoid tissue.*

7th. Osteo-myelitis frequently produces *abscesses in the neighboring soft parts,* of which we have seen numerous examples.

8th. Osteo-myelitis not unfrequently causes the blood to coagulate

in the veins leading from the affected part, thus producing thrombi, and inaugurating the peculiar morbid process which Virchow has called *thrombosis.* In fifty-one cases of this disorder, six are known to have had thrombosis. Several of them had parenchymatous hemorrhage, in consequence of the venous obstruction. In one of them it was very profuse, and proved fatal. This patient did not have pyæmia.

9th. Osteo-myelitis often occasions *pyæmia.* Of fifty-one cases of inflammation of the medullary tissue, pyæmia supervened in eighteen, and all of them died. In each of these cases the suppurating marrow appears to have been the focus from which the purulent infection sprung. Furthermore, in cases of osteo-myelitis having a fatal termination, pyæmia is the immediate cause of death more frequently than all other causes combined. Thus, of fifty-one cases of osteo-myelitis, thirty proved fatal, and of these, eighteen, or considerably more than one-half, died of pyæmia. Hence it is believed that pyæmia is the form of systemic intoxication which is produced by suppurative inflammation of the marrow. Clinical observation has also abundantly shown that purulent infection occurs in surgical cases but seldom, speaking comparatively, unless the osseous tissue is injured.

10th. Osteo-myelitis is sometimes complicated with *leukæmia*, of which I have seen one remarkable instance.

11th. Osteo-myelitis not unfrequently occasions death by *exhaustion.* Of thirty fatal cases of said disease, six died from that cause.

But the closeness of the relationship which exists between suppurative inflammation of the medullary tissue of bone and pyæmia is very remarkable. No such relationship obtains between suppurative inflammation of any other tissue in the whole body and that disease. It is but seldom that we meet with pyæmia in a severe form in military practice, unless it has followed a traumatic lesion of the osseous tissue, or a surgical operation rendered necessary by such lesion. The writer has seen only two cases of pyæmia in military practice which were entirely disconnected with injury of bone, among a large number of instances of that disease.

Now, this question naturally arises, namely: Why is it that the purulent infection is very apt to follow after suppurative inflammation involving the medullary tissue of the femur, for example, and almost never occurs in connection with suppurative inflammation of the muscular and connective tissues of the thigh, unless a lesion of the osseous tissue also is present? In answer to this question it has been suggested that the patulous condition of the veins in the osseous tissue, and in the marrow itself, occasions the difference. It is believed that the patulous

condition of the veins belonging to those tissues facilitates the absorption of the liquor puris and the contamination of the system at large with a purulent infection.

Treatment of Osteo-Myelitis.—The treatment of this disease must be considered in respect to that which is best adapted to procure relief from the acute and chronic varieties of it respectively.

1. The *prophylaxis* and the *hygienic treatment* of osteo-myelitis constitute a subject of very great importance. The chief objects to be accomplished by the prophylactic treatment, in cases of injured bones, are to prevent a simple formative irritation of the marrow from becoming an inflammatory irritation, and if, perchance, the inflammatory process has been excited in the medullary tissue, to prevent it from running into the stage of suppuration; and if, again, suppuration has been established, to prevent it from degenerating into the putrid forms thereof, which are almost certain to induce pyæmia, and thus occasion the death of the subject. The elements of the hygienic treatment of osteo-myelitis consist in placing the patient beyond the reach of certain deleterious influences which tend to impair the forces of his system and to poison his circulating fluids, and thereby convert a simple into a destructive osteo-myelitis, and finally produce death by pyæmia. The deleterious agencies of which the hygienic or prophylactic treatment takes cognizance are chiefly foul air, especially the foul air of imperfectly ventilated hospitals, the over-crowding of patients, especially those who are wounded, and want of cleanliness. The principles of the hygienic treatment require that the wounded, especially such of them as have sustained lesions of the osseous tissue from any cause whatever, should not be treated in the wards of imperfectly ventilated hospitals; that it is much preferable to place them in hospital tents; that an air space of at least twelve hundred cubic feet should be allowed each patient, even in well ventilated hospitals that have been constructed with special reference to the care of the wounded; that an allowance of less than twelve hundred cubic feet of air space to each patient (I am speaking of the wounded) amounts practically to overcrowding; that the hospital quarters, utensils, bedding, clothing, etc., and the person and wounds of the patient should be kept scrupulously clean, and that the patient himself should be kept in a quiet and composed state of mind and body. The air of the ward or apartment in which the wounded are treated should not be allowed to become contaminated with the effluvia arising from suppurating wounds. To prevent such an occurrence the ventilating apparatus should be so constructed as to furnish a constant and abundant supply of pure atmo-

spheric air. It should have the capacity of renewing all the air of the ward as often as once in every hour at least, if necessary, and the supply should be constant and equable.

2. *Internal medication.*—Since osteo-myelitis is, for the most part, a disease of debility, the internal treatment should partake of a supporting, tonic and soothing character. The diet should generally be nourishing and easy of assimilation, and care should be taken that it is sufficient in quantity. It should consist very largely of strong beef tea, or strong broths made from other forms of animal food. Both the mineral and the vegetable tonics have been found servicable in this disease. Among the former the ferruginous preparations, such as tinct. ferri muriat. and ferri et potassæ tart., and among the latter quiniæ sulphas have appeared to be the most useful. The citrate of iron and quinine is a convenient remedy. When the inflammation of the medullary tissue was complicated with a scorbutic taint, as it not unfrequently is in military practice, the tartrate of iron and potassa was administered with very good results. In some cases of this disease which I have seen in military practice, the debility or the depression of the systemic forces has been so great as to require the administration of alcoholic stimulants, in the form of ale, porter, wine, milk-punch, etc., together with nutrients and tonics, from the outset of the attack. For the alleviation of pain, which in both the acute and chronic varieties of this disease is often very considerable, it has been found necessary to give anodynes, of which the various salts of morphia, especially when administered hypodermically, have proved extremely valuable. The febrile movement, which is always present in the acute variety of the disease, oftentimes renders it advisable to prescribe aconite with febrifuge remedies, such as mistura neutralis, spts. Mindereri, etc. Stanley recommends that in cases of acute inflammation of the medullary tissue mercury should be administered internally, "in the view of producing its full influence upon the system." (Op. cit., p. 45.) Now, inasmuch as this affection is one which belongs especially to debilitated subjects, and is also essentially a disease of debility, the propriety of administering mercury to the extent of ptyalism in its treatment is, to say the least, questionable. I have never seen a case of osteo-myelitis which would, in my opinion, have been benefited by a mercurial course of treatment. On the other hand, it has always seemed to me probable that such a course of medication would have done much harm to the subjects of that disease which have come under my observation. Indeed, I should as soon think of ptyalizing a patient affected with tubercular pneumonia in order to cure his disease, as to ptyalize the

patients affected with osteo-myelitis that have come under my notice. There is, however, one remedy which can often be administered, in the subacute and chronic forms of the disease, with much benefit, and that remedy is the iodide of potassium. It generally proves most serviceable in cases where nocturnal bone-pains are present. In some cases it is necessary to administer large doses of this remedy in order to obtain the relief desired. It is, therefore, a good plan to give this medicine in increasing doses in all obstinate cases of the disease wherein its administration is indicated.

The *rheumatic*, the *syphilitic*, and the *scrofulous* types of osteo-myelitis require internal medication appropriate for the removal of the special diathesis upon which the local affection depends.

3. *Topical medication.*—The part affected with acute osteo-myelitis should be placed in such a position as does not favor the stagnation of blood in its vessels; that is, it should be placed in an elevated position, and should be kept in a state of perfect rest.

If the severity of the attack be very great, and the patient's strength considerable, it may be advisable to abstract blood locally with leeches or cups. This means of subduing inflammation should not be overlooked, especially when the disease appears in asthenic form.

In most cases of acute inflammation of the medullary tissue, the ice-dressing can be applied to the diseased part with benefit. Should the ice-dressing prove to be uncomfortable because of its weight, the cold irrigation can be employed in its stead. Should the cold applications cause the patient to be chilly and to feel disagreeably, warm applications, such as the warm water dressing, should be substituted for them; and, generally, the patient's sensations will afford a guide that is sufficiently correct with regard to the use of cold, tepid or warm applications in the treatment of the acute variety of this disease.

In the subacute and chronic forms of osteo-myelitis, the tincture of iodine can often be applied to the affected part with marked advantage. It should be applied daily, and over a large extent of surface.

4. *Operative medication.*—Incisions into the inflamed soft parts down to the bone may often be advantageously made in treating both the acute and chronic varieties of this disease, for a considerable amount of local depletion is always obtained in this way. Furthermore, they are always required when accumulations of matter (abscesses) are formed, and for the relief of such a condition should be made at an early period —indeed, the earlier the better after the presence of pus is once detected. Osteo-myelitis, when it occurs spontaneously, is very apt to be accompanied by diffuse inflammation of the soft parts, which, to

a greater or less extent, masks the real nature of the disease. In all such cases free incisions carried down to the bone prove very beneficial. They relieve the painful tension of the soft parts immediately, and, at the same time, evacuate any purulent matter which may have collected between the detached periosteum and the bone. Even in cases where the diagnosis is doubtful and the soft parts are in a state of diffuse inflammation, it is considered justifiable practice to cut down to the bone in order to ascertain the condition of the periosteum and whether it is detached, and likewise the condition and appearance of the bone and whether it is necrosed, for by so doing the diagnosis can be settled.

The operation of *trephining* the diseased bone may sometimes be advantageously practiced in cases of osteo-myelitis. In the form of chronic inflammation of the medullary tissue, which is called chronic abscess of bone, the evacuation of the purulent matter and the removal of the diseased tissue by means of this operation afford the only means of obtaining a cure short of amputation. Thus *Duverney* states that in two cases, where matter was imprisoned in the bony tissue, it was necessary to perforate with a trephine. (*Vide* Traité Pratique d'Anatomie, Médico-Chirurgicale, par A. Richet, p. 61. Paris, 1860.) *Hey*, as we have already shown, performed an analogous operation upon the tibia, in two instances of abscess of the medullary canal, with a good result in both of them. It also appears that the trephine has sometimes been usefully employed in treating inflammation of the medullary tissue having a more acute form. *Mr. Abernethy* states, in his Surgical Observations, that he has seen several cases of suppuration in the diplöe of the cranium, where, the trephine having been applied early, the external table of the skull came away in the crown of the instrument; "the matter was discharged from the medullary part of the bone, and the internal table remained sound and entire, covering the dura-mater. Granulations soon arose, and the patients got well with the exfoliation only of a portion of the outer table." (*Vide* op. cit., vol. ii.; also Stanley on the Bones, p. 59.)

Again, *excision* of the diseased part by surgical operation not unfrequently becomes necessary in the treatment of osteo-myelitis involving the bones of the extremities. Thus, of seven cases of that disease reported by *Mr. Stanley*, three were treated successfully by amputation. The arm was amputated in one instance, and the thigh in the other two. One case recovered without the performance of any operation. In it a large part of the tibia exfoliated, and the knee joint became permanently anchylosed. In this case, also, the pain, which was very great, and the inflammatory fever, which ran very

high and was accompanied by delirium, were all relieved by the bursting of a large abscess a little below the knee. Could not relief from these distressing symptoms have been obtained at an earlier date by making free incisions? In the remaining three of Mr. Stanley's cases no operation could be practiced, and they proved fatal.

Limbs affected with destructive osteo-myelitis may be excised either by *amputation or by exarticulation*. *Mr. Stanley*, as we have just seen, employed the operation of amputation. *Dr. T. Vallette*, however, finding all his attempts to save patients affected with acute osteo-myelitis following gunshot fracture of the long bones, in the Crimean war, by secondary amputation performed in the continuity of the limb, ineffectual, recommended that amputation should be abandoned in the treatment of such cases, and that exarticulation of the diseased bone should be practiced in its stead. *Dr. Jules Roux*, at the hospital of St. Mandrier, at Toulon, also found that he could not save his osteo-myelitic patients (they were soldiers who had been wounded in the Italian campaign of 1859) by secondary amputation, and therefore put into practice the recommendation of Vallette. He achieved a remarkable success thereby, for in twenty-two successive cases wherein the operation of exarticulation was performed for osteo-myelitis, no death occurred. Moreover, four of these exarticulations were performed at the hip.

The operation of exarticulation presents the following advantages over amputation performed in the continuity of the diseased bone in cases of osteo-myelitis:

1st. It effects the removal of the whole of the diseased medullary tissue, while amputation in the continuity does not. Now, the inflamed medullary tissue which is left behind in the stump-bone by amputation performed in such cases proceeds unchecked to the stage of suppuration, and ultimately destroys the patient by inducing pyæmia, with about the same certainty that it would if no operation had been performed, of which I have seen at least one remarkable instance, and have had the pathological specimens belonging to the case figured in colors, after nature. 2d. The operation of exarticulation does not expose the medullary tissue to injury; and, 3d. A longer stump can be obtained for the patient in this way than by amputation performed in the continuity of the sound part of the limb. The operation of exarticulation has already been performed several times in this city for osteo-myelitis. Thus, *Dr. Weir* has exarticulated the thigh at the hip for chronic osteo-myelitis of the femur following gunshot fracture, with a good result, at St. Luke's Hospital. *Prof. Van Buren* exarticulated the leg at the knee for acute osteo-myelitis of the tibia, last March, in private

practice, with a good result also; and recently *Prof. Hamilton* has exarticulated the thigh at the hip for chronic osteo-myelitis of the femur, at Bellevue Hospital. In this case the disease occurred spontaneously. The operation was not attended with shock. The patient did well for a period of two weeks, but ultimately died, with symptoms of pyæmia.

Chronic osteo-myelitis involving the stumps of amputated limbs often produces morbid conditions which require operative interference. For example, it often occasions deep-seated abscesses which require early and free incision. Furthermore, osteo-myelitis in its subacute and chronic forms is very apt to occasion necrosis of stump-bones. In most instances belonging to this category the necrosis is limited to the lower portion of such bones, but occasionally it involves the whole of the shaft up to the superior epiphysis. Many cases of necrosis of stump-bones produced by osteo-myelitis were witnessed in our military hospitals during the late war. The operative treatment usually employed consisted in the extraction of the necrosed portion of the bone from the stump by surgical means, as soon as it had become detached from the living osseous tissue. For this purpose, incisions were made in the end of the stump to such extent and in such directions as might be necessary, in order to effect the liberation of the dead bone, which was then generally extracted with necrosis forceps without further difficulty. The result of such cases was almost invariably favorable.

In concluding this memoir, the writer desires to say that it has, in the main, been drawn up in connection with an extended report on the subject of osteo-myelitis which he has prepared at the instance of the U. S. Sanitary Commission, and that the clinical observations, pathological investigations, anatomical facts, and arguments upon which the conclusions exhibited in this memoir are founded, are stated at length in said report.

PROCEEDINGS OF SOCIETIES.

NEW YORK PATHOLOGICAL SOCIETY.

Stated Meeting, December 12, 1866.

Dr. A. C. Post in the Chair.

HYPONYCHIAL EXOSTOSIS—REMOVAL.

Dr. Post presented a specimen of hyponychial exostosis which he had removed a few days before from a child only five years of age.

The tumor was mainly cartilaginous, having only here and there through its substance a few spiculæ of bone. The nail was first divided, the projecting portion of the morbid growth shaved off with a scalpel and its extirpation completed with a gouge. He had never before met with an instance of this trouble in a child of such a tender age.

Dr. GOULEY remarked that he had been in the habit of using nitric acid to these growths, with very good success. In those cases in which the disease was extensive he advocated the removal of the last phalanx.

Dr. POST gave it as his impression that if the substance of the bone, in any given case, was denuded in the operation, there was a very good prospect for recovery.

TRICHINA SPIRALIS.

Dr. ALLIN exhibited a small portion of muscle containing the trichina spiralis. As the specimen was obtained from a dissecting-room subject, no history of the symptoms of the patient before death could be given.

Stated Meeting, December 26, 1866.

Dr. FRANK H. HAMILTON, President, in the Chair.

PERICARDITIS, ENDOCARDITIS AND SUDDEN DEATH.

Dr. BEACH presented a heart which was removed, on post mortem examination, from the body of a married female, twenty-two years of age, who was found dead in her bed. No account of any illness which she previously might have had could be obtained from her friends, except a slight febrile movement for two or three days before her death. The post mortem examination, which was made at the instance of the coroner, revealed adhesive pleurisy of the left lung, together with evidences of recent pericarditis. Further, on opening the heart, a fringed growth, the size of the end of the little finger, attached to the septum, just below the aortic valves, was found projecting into the cavity of the left auricle.

It is necessary to state, in this connection, that no atheromatous deposits were found in any of the larger arteries.

Dr. ROGERS remarked that the growth presented the appearance of being nothing more than a deposit of fibrinous material, the result of a limited endocarditis following pleurisy. He was confirmed in this opinion from the fact that fragments of the material so deposited

could easily be separated from the parts underneath, leaving the endocardium intact.

Dr. NEWMAN noticed that there was commencing ulceration of the septum on the side opposite to the deposit.

ASCITES — CYSTIC TUMOR OF LEFT OVARY — PERITONITIS — SUPPURATION— DEATH—COLLOID CANCER OF OVARY THE PRIMARY LESION.

Dr. H. S. HEWIT exhibited an interesting specimen of colloid cancer of the ovary, which was accompanied with the following history:

Catharine S., died at 335 Third avenue, on the 22d of December, 1866, aged 28 years.

She was a spinster, born in Manchester, England, of healthy parents. She lived in the city of her birth, sharing the ordinary privations of the children of the operative classes, till the age of eight, when she came to New York, with her parents.

She lived a perfectly regular life, and became a seamstress and shop woman. Her condition, as respects shelter, food and clothing, was equal to the best people of her class in life.

Before death she presented the following appearance and symptoms: Haggard and emaciated countenance, enormously distended abdomen, exhaustion, breathlessness, œdema of legs and thighs, complete constipation, kidneys acting nearly naturally, intelligence clear, spirits depressed and mind gloomy.

Diagnosis.—Fibro-cystic tumor of left ovary; suppuration of cyst or cysts; peritonitis and adhesions.

Prognosis.—Fatal.

History.—About five years previous to the date of death she began to feel slight pain in the diseased ovary, together with vague and hysterical impressions of a distressing but undefinable character. Soon aftewards her abdomen began to enlarge, and the case was pronounced idiopathic ascites. At the end of two years she was tapped. The accumulation returned, and the operation was repeated at the expiration of each of the two succeeding years.

Early in September last she came under my observation, and at that time she was suffering from ascites, and, on examination, there was discovered a well defined tumor in the region of the left ovary.

Her appearance was cachectic and indicative of malignant disease. I decided to withdraw the accumulated fluid, and fixed a day for the operation. On that day I discovered, for the first time, evidences of peritonitis, and accordingly postponed the contemplated tapping, and treated the case by applying leeches to the affected part, rest, fomentation, and morphine.

The signs of peritoneal inflammation disappeared, and in two weeks I punctured the abdomen in the usual place, and drew a pint of flocculent serum, followed by half a pint of pus. The cavity opened was apparently emptied, but the walls of the abdomen refused to collapse.

The operation was followed immediately by excessive depression, and in half an hour by excruciating pain.

The pain was controlled by the hypodermic injections of morphine, which were continued daily for four weeks, and until nearly the period of death.

Soon after a consultation, consisting of several of the most eminent obstetrical surgeons, was called, when the diagnosis given above was substantially confirmed, and expectant treatment advised.

The patient slowly sank and died.

Autopsy, forty-eight hours after death.—Recent adhesions throughout opposed peritoneal surfaces; sac containing nearly four gallons of pus and flocculent serum; left ovary a mass of colloid degeneration; cyst forming in right ovary; left kidney enlarged and slightly fatty; right kidney atrophied by pressure; liver enlarged and fatty.

Appreciation.—The case was seen and diagnosticated two years previously by Dr. Noeggerath as one favorable for operation. The operation, if successful, would undoubtedly have been speedily followed by death, in consequence of the cancerous cachexia.

Life was probably prolonged to the latest possible moment.

The family of deceased are strumous, and two members have died of phthisis.

The treatment of this case was tonic, stimulant, nutritive, anæsthetic and euthanistic.

The Society then adjourned.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Conservative Surgery, as Exhibited in Remedying some of the Mechanical Causes that operate injuriously both in Health and Disease. With Illustrations. By HENRY G. DAVIS, M.D., Member of the American Medical Association, etc., etc. New York: D. Appleton & Co. 1867. 8vo, pp. 314.

This handsomely printed and well illustrated volume has been written for a double purpose: first, to record the "accumulations of

over thirty years' investigations" of a special branch of "mechanical surgery," to which it is known the author has devoted himself with great zeal, industry, and success; second, to assert, and maintain a claim to the introduction and application and perfection of the principle of treatment of certain affections of the joints by "continued elastic extension." The author tells us that his "endeavor has been to discover and elucidate principles; hence, any success attained possesses a value in proportion as the subjects embraced by a principle are of advantage to man in promoting his happiness or in prolonging his life." An "Index of Subjects"—there is no Table of Contents—shows the range of ground that is traveled over, comprising: Fractures in General, Fractures of Patella, Fractures of Processes, Fractures Intra-Capsular, Dislocations[1] Old, Dislocations Congenital, Pseudo-Anchylosis of Ulcerated Joints, Pseudo-Anchylosis of Joints from Rheumatism, Muscles and Tendons, Talipes or Club-Foot, Deformities of the Upper Extremities, Deformities from Paralysis, Genu-Valgum or Knock-Knee, Lateral Curvature of the Spine, Synovitis, Morbus Coxarius, Ulceration of Knee and other Joints, Pott's Disease of Spine, Rachitis, and Osteo-Malacia; with Spinal Irritation, Phthisis, and Uterine Correctors thrown in as make-weight, along with a History of the Development of the Treatment of Joint Diseases. Our limits will only let us take a rapid cast at some of the subjects.

In the first chapter Dr. Davis writes: "This principle of treating fractures by simple 'continued elastic extension,' was *urged by us upon the profession* in the early part of the year 1856, and yet it was not generally recognized until applied by Dr. Buck, in 1860." What, may be asked, was the principle generally recognized by the profession who have used the straight splints of Dessault and Boyer, and their several modifications, with extension and counter-extension? But, coming down to the very time of Dr. Davis's alleged discovery, have we not the apparatus of Dr. John Neill, of Philadelphia, for the treatment of fractured thigh, which is the very embodiment of this

[1] In the Gazette des Hôpitaux, June 26, 1866, there is reported by Mr. T. Anger, one of Dr. Nélaton's house surgeons, a very interesting case of the reduction of an intra-coracoïdien luxation of the humerus, by continuous elastic extension—india-rubber tubing being used—and in which the ordinary methods had been tried and failed. Mr. Anger states that four years ago the idea of applying the "principle" used in the treatment of malpostures of joints to the reduction of dislocations occurred to himself and his colleague, Mr. Legros. He looks upon it as much superior to the usual methods, complete muscular relaxation happening in from fifteen to twenty minutes.

principle of "continued elastic extension," and counter-extension being made by means of a twisted rope, each end of which is fastened respectively to the perineal band above, and the adhesive plaster extending-band below, and which had been in use several years before 1856, and was described in the *Medical Examiner* for 1855, nearly one year before Dr. Davis began to urge his discovery upon the profession. On reading what our author has to say about fractures, in which the stalest truisms familiar to every surgical tyro are paraded as new truths, and the results of "continued elastic extension applied to a fractured limb with sufficient force and for a sufficient length of time," we can readily appreciate the acknowledgment that "our time being so constantly occupied with those difficulties in which we have changed the mode of treatment, it has left but little [time or thought?] to devote to ordinary fractures" (p. 7). But why write about them, then?

In the next section, on Fracture of the Patella, we are told that Dr. Sanborn, of Lowell, Mass., "has devised the most simple process for securing bony union;" but the chronic grievance is again trotted out, and the author adds: "Yet he has not recognized the *principle* by which the contraction of muscles can be overcome in similar cases." So far as we can make out, the complaint of Dr. Davis is, that the profession, in treating fractures, have been for a long time following a right practice without knowing it, like the Bourgeois Gentilhomme of Molière, who, when he wanted to learn prose, found out, to his utter amazement, that he had been talking it all his life. Our author's plan of overcoming the contraction of the muscles inserted in the patella is a good one, and "does not interfere with any device the surgeon may wish applied for securing the fragments in apposition." We must, however, protest against such a statement as the following: "We have at present a case [of transverse patella fracture] under treatment that exhibits every thing desirable thus far, having united by bone." Now, without caviling at the construction of the sentence, or denying that in every case of broken knee-pan treated by "the principle" bony union may happen, we submit that no evidence of the fact is given in this case, and that the question could hardly have been satisfactorily solved at a time when, it is owned, the "case had a weight of four pounds upon each side of the limb." Not to speak of the extreme infrequency of true bony union in transverse fractures of the patella, how often, when the surgeon is satisfied that he has got good ligamentous union, does he find, after the patient has been on his legs for a while, that he has been mistaken?

The chief disorders, however, in which Dr. Davis claims to have applied "the principle" of continued elastic extension successfully, by means of various ingeniously contrived mechanical apparatus, are the several varieties of talipes, lateral curvature of the spine, morbus coxarius, ulceration of the knee and other joints, and Pott's disease of the spine. He believes "that we gain as surely, and with much more safety, the objects usually sought by tenotomy in the treatment of the several varieties of talipes and other affections of the joints, by using apparatus" which "overcome the shortened ligaments and muscles," and by the application of what he calls "artificial muscles," to take the place of the disused and incapacitated ones, whose function is in abeyance, and which by this contrivance can be "called into play, at first passively, but at length through the medium of the will of the patient as they gain volume and tonicity." The true principles upon which Dr. Davis's treatment of club-foot is based are now so generally recognized, as well as the excellence of the several mechanical means by which he has proposed to carry them out, that it is hardly necessary to dwell on the subject.

We find the following excellent remarks in the section on the treatment of lateral curvature of the spine:

"The apparatus should not confine the muscles, but aid them in overcoming the deformity. It must not impede or interfere with the process of educating the muscles, but should aid them in their efforts to overcome the curvature. There is another physiological consideration in the use of apparatus based on these principles: it serves to bring the form up until the muscles and ligaments that are shortened become tense, and there hold it; the force being elastic, if the parts yield the instrument follows up, retaining the muscles and ligaments at the same degree of tension. . . . Positions should always be used as auxiliary to the apparatus" (p. 152).

Various exercises, by which "each muscle or set of muscles is to be educated," are insisted upon, and the reader is properly told that they must be specially adapted to each individual case, with the remark, that "the surgeon who cannot apply mechanical principles to the treatment of lateral curvature of the spine would do better to save his time and reputation by not attempting it" (p. 153). Some sensible general directions are given. Constitutional treatment is not overlooked, including a well regulated diet and suitable exercise in the open air. The whole of this chapter will repay careful reading, as will the chapters upon synovitis, morbus coxarius, ulceration of the knee and other joints, and Pott's disease of the spine.

We come now to what we have stated to be one of the author's objects in the publication of this work, namely, "To place on record a true history of his claims to the discovery of some important facts in the pathology of joint diseases, and the treatment based upon those facts" (p. 308). The claim, as distinctly formularized, we understand to be: "*The discovery was early made by me, that if the pressure were removed from the diseased vertebræ, in the treatment of ulcerated vertebral joints, or Pott's Disease, it removed what was evidently the cause of the pain and constitutional irritation.* This result being established, my attention was further directed to *the application of the principle to other joints.* In 1856 [*New York American Medical Monthly*] I had fully established the treatment of morbus coxarius, upon the plan of overcoming the pressure effected by the muscles through the means of 'continued elastic extension.' In 1859 I reported 'A Case of Pott's Disease, with Remarks on Morbus Coxarius,' in the *American Medical Monthly.* In the same year and month I published, in the *New York Journal of Medicine,* a paper 'On the Effects of Pressure upon Ulcerated Vertebræ and in Morbus Coxarius, and the Relief Afforded by Mechanical Remedies, with Cases'" (p. 308).

Passing over the indefinite claim to "the discovery of some important facts in the pathology of joint diseases," which facts are not mentioned in the work, we come to a specified claim of the "discovery," at a date not given, of the practical fact that pressure of the diseased vertebræ in Pott's Disease is the cause of the pain and constitutional irritation, and that on its removal these conditions cease. Now we would ask Dr. Davis on what principle the various mechanical contrivances of Le Vacher le Feutre and other orthopœdists (for the date of whose publications we refer him and our readers to the bibliography appended to Mr. Lionel J. Beale's Treatise on Distortions) were conconstructed? That "the principle" was recognized in England in the beginning of the present century is certain from the following passage, written by Dr. Edward Ford, in his "Observations on the Disease of the Hip-Joint." We quote from the *second edition,* printed in 1810, after the author's death, and edited by Mr. T. Copeland; the exact date of the first edition we do not recollect. Speaking of Le Vacher's instruments for the treatment of disease of "ulcerated vertebral joints," Dr. Ford writes: "The advantage of these machines, *if they do but serve to take off the pressure,* cannot be doubted. Their aptitude for this purpose, and their acknowledged utility in the support of the head and *the diminution of its pressure on the trunk,* are facts deserving attention. It would be fortunate if the knowledge of these circum-

stances could suggest any important mechanical improvement *calculated to produce the same beneficial effect in hip disease, as nothing can be clearer*, from natural manifest indications, *than that patients must feel ease and advantage from every expedient to prevent the weight of the body, in any degree whatsoever, from pressing on the joint during the prevalence of the disease, or whilst in a state of gradual convalescence*" (p. 134).

In the second edition (1833) of "A Treatise on the Distortions and Deformities of the Human Body," etc, Mr. Lionel J. Beale, speaking of the various machines in vogue for the cure of spinal and limb deformities, and particularly of Delpech's apparatus,[1] says: "Any benefit which may result from such an apparatus must be derived from the *power of extension* in overcoming the contractions of muscles" (p. 317). And subsequently: "For the cure of contracted joints it is necessary to have a permanent force acting for the purpose of flexion and extension to *effect an elongation of the shortened muscles.*"

In the fourth edition (1842) of "Pathological and Surgical Observations on Diseases of the Joints," Sir Benjamin Brodie writes: "When, in consequence of extensive destruction of the articulation [hip-joint], the muscles begin to cause a shortening or retraction of the limb, I have found great advantage to arise from the *constant application of an extending force, operating in such a manner as to counteract the action of the muscles.* . . . I will not say that the effect of such a contrivance is to prevent the shortening of the limb altogether, but I am satisfied that it will, in a number of instances, render it less than it would have been otherwise, at the same time *preventing*, or *very much diminishing, that excessive aggravation of the patient's suffering with which the shortening of the limb is usually accompanied.*"[2]

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[1] De l'Orthomorphie, par J. Delpech. Paris, 1829.

[2] In the first edition of the work, published in 1818, this passage does not occur. It may be in the second or third, which we have not seen. But in the first edition the ill effects of pressure of the articulating surfaces upon each other, in *all* joint diseases, are constantly insisted upon. At page 288, treating of vertebral caries, Sir Benjamin says: When "the weight of the head and other superincumbent parts is pressing the ulcerated surfaces one against the other, it is not likely that the progress of the ulceration can be checked, and it is highly probable that suppuration will be induced." Afterwards, speaking of Mr. Pott's caution against the use of mechanical contrivances for elongating the spine, he writes: "But it is also plain that the disease is likely to be aggravated by the pressure of the superincumbent parts; . . . and if instruments be employed simply for the purpose of supporting the column of the vertebræ, and taking off the weight of the head from the ulcerated surfaces, . . . it is reasonable to expect that they may be pro-

In the *Medical Examiner*, January 19, 1839, the late Dr. William Harris, of Philadelphia, reports a case of morbus coxarius treated several years previously by permanent extension and counter-extension, Gibson's modification of Hagedorn's apparatus having been used. Dr. Harris remarks he "is satisfied that extending and counter-extending apparatus, *timely applied and continued a sufficiently long time*, will prevent any shortening of the limb or deformity from coxalgia."

In 1852, Dr. Alden March, of Albany, used "the principle" of continuous extension and counter-extension in a case of hip-joint disease, by means of a modified Physick splint, a perineal band, and a foot-piece. (Transactions of American Medical Association, 1857.)

If we had the inclination want of space would make it impossible for us to go into any examination or discussion of Dr. Davis's claims to priority in the discovery of "the principle" setting forth the evils of pressure in disease of the joints caused by muscular contraction, and the mode of treatment best calculated to overcome the action of the muscles—continued extension. We have thought it proper to place in juxtaposition to the author's claims, given in his own words, the extracts from the several works we have quoted. We do not deny that Dr. Davis may have thought out his subject, and reached his conclusions, independently and without any knowledge of what had been done by others, and at one time may have rightly looked upon the results of his observations and practice as a discovery; but what does strike us oddly is that no allusion is made anywhere in his book to the fact of the same views having been held and taught by other writers on the same subjects, with whose works it would be great injustice to suppose Dr. Davis unacquainted, and whose publications ante-dated his, in some instances at least, half a century. Dr. Davis has, however, solid claims both upon the profession and the public, which, as far as the evidence is before us, are beyond cavil. These claims are justly stated in the report made by a committee to the New York Academy of Medicine on our author's mode of treatment of joint diseases. "This method," writes the reporter, "is undoubtedly a very great improvement upon all others which have preceded it. We have, in the method described by Dr. Davis, the first intimation of extension being carried out in the treatment of this disease, through all its stages, in a manner calculated to relieve the suffering of the patient, to arrest the progress of the

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ductive of advantage to the patient" (p. 291). And again: "An instrument judiciously applied will be useful, not only by affording support to the spine, but also by preventing the weight and motion of the parts above from exciting a recurrence of the caries" (p. 293).

disease, and, at the same time, allow of active exercise in the open air." The practical methodical application of "the principle," so far as we are now informed, unquestionably belongs to Dr. Davis; he was the first to simplify and place within the reach of the profession apparatus by which the pressure of the articulating surfaces of diseased joints could be hindered, without confinement to the bed or room; and all apparatus since made in this country, with a view of carrying out or extending this principle of treatment, are only modifications of the original apparatus of our author, and no one is warranted in assuming that they would have been thought out, or "dreamt out" by others, if Dr. Davis's apparatus had not been accessible to the profession.

Acknowledging fully how much is due to Dr. Davis for our present improved treatment of joint diseases, and sympathizing with his feelings at what he regards as attempts to undervalue his labors, and "filch from him his good name," we still cannot but regret that he has permitted himself to use in a scientific work such expressions towards those whom he feels have wronged him as we find at pages 218, 265, 266, 311, etc. His cause is too good to risk damaging it in this way. He should have recollected Dr. Johnson's reproof to a vituperative antagonist: "You raise your voice when you should enforce your argument." The author puts facts so strongly, and, as we believe, truthfully, that no words can add to the damning potency of a simple statement. To appropriate the labors of another, rob him of the cunning of his hand, and deny to him his just rights, "non est vitiosus, sed vitium."

We cannot help thinking that enthusiasm for "the principle" and the mechanical means based upon it, has somewhat biased our author's judgment, and that his appreciation of the results of his method of treatment will not always stand the rough scrutiny of facts in the practice of others. He writes, page 217: "Some years ago we stated, before the Academy of Medicine of this city, that a patient ought not to die from the advance of the ordinary disease of the hip, knee, or vertebræ. We now go further, and say that they not only ought not to die from these affections, but that they ought to recover without deformity in most cases, and in all, with but slight, if subjected from the first to treatment by *continued elastic extension*." Is not this somewhat overstating the case, particularly when the author himself admits the constitutional nature of these disorders, and speaks of them as being due to "tubercular cachexia," and as "tubercular deposits in the lungs, tuberculization and enlargement of the bronchial ganglions, and also of the peritoneum, and, in children, strumous deposits in the lymphatic

ganglions of the pelvis and mesentery. . . . Sometimes strumous deposits are found in the spleen, and the liver is often cirrhosed and enlarged, and the glands of Peyer are occasionally enlarged" (p. 204). This catalogue of possible lesions furnishes, we think, a satisfactory answer to the question propounded (p.218), "Why should persons die with ulceration of a joint, if, during the whole progress of the disease, they are placed, through the means of proper apparatus, in a condition in which they are *absolutely free from pain and all constitutional disturbance*, and in which they can eat, drink, sleep, and enjoy life as well as the best, with the slight exception of perfect locomotion? The same is true in Pott's disease and white swelling." To be sure, in the section on Phthisis Pulmonalis—which, we must own, did "at first appear incongruous to bring forward in a work devoted to mechanical surgery"—we have the startling statement, that the most reliable resources for the cure of this disease are to be found under the head of mechanical remedies, and that by permanently increasing the amount of chest space and lung surface through mechanical means of voluntary forced inspirations, when "commenced with the disease (phthisis) and pursued uninterruptedly, there is every reason to expect that every case will recover. When the treatment is used as a prophylactic, every case will be prevented" (p. 304). Dr. Davis very sensibly adds: "This may excite incredulity in the minds of most readers. It is but a few years since the results in the treatment of joint-diseases, now known to be attainable, were looked upon in the same light." Our author naively remarks: "It is obvious to our mind why this disease has been so irremediable;" and it is to ours, and why it is likely always to remain so, even with Dr. Davis's "principle" added to its thousand and one remedies.

There is one point, however, which the author insists upon, and with which we are happy to say we can agree with him without any qualification; it is this: "We would discourage the habit in our profession of taking *so much upon trust*." We would, in a kindly spirit, suggest to Dr. Davis, in another edition, to leave out at least one half of the present volume, and, limiting himself to the treatment of those affections of the joints with which his long experience has familiarized him, and for which he has done so much, to introduce freely cases sufficiently in detail to illustrate and support his views. In doing this we feel certain that the profession will have a valuable record to refer to, and that Dr. Davis will be greatly the gainer in usefulness and reputation.

Orthopedics: A Systematic Treatise upon the Prevention and Correction of Deformities. By DAVID PRINCE, M.D. Philadelphia: Lindsay & Blakiston. 1866. 8vo, pp. 240.

"This treatise," the author writes, "has been prepared with special reference to the wants of physicians engaged in general practice." The various books and monographs which have been published upon the subject have been "sifted and collected into a few pages, within the means of all to purchase it [them], and within the time of all to read it [them]. To these ends, an attempt has been made to connect the medical treatment with the mechanical, in order to give the work its nearest practical approach to completeness compatible with the necessary brevity." (Preface.) We regret that Dr. Prince has thought proper to adopt the barbarous and senseless term orthopædics (which he spells *orthopedics*,) meaning nothing and telling nothing; and hence the second title to explain the purpose of the book, which is really chiefly about distortions and the author's notions of the best ways to remedy them.

The work is in two parts, preceded by a *definition*, which is scant and faulty, from taking no note of the pathogeny of the distortions in question—the true morbid muscular condition—and which must be understood before any treatment can be knowingly adopted, for all rational curative measures must be based upon it. Part first opens with a "Classification of Deformities by their Causes," in five divisions, and covering a pretty wide range, including (1), arrest, redundancy or misplacements of development; (2), perversion of relation of parts through muscular contraction; (3), inflammation and perversion of nutrition [are they not one and indivisible?]; (4), accidents, as breaking, tearing, freezing, etc.; (5), mutilation of parts designedly done, or force or restraint artificially applied, the latter ranging from "the compression of the feet of the female children of Chinese grandees to that of the less degree in the feet and waists of genteely (!) educated children in modern American and European society."

Part second treats of particular diseases and deformities not noticed, or incidentally referred to, in the preceding part, and actually of muscular distortions, which, after all, we take to be the real object of the book. With the exception of the second section, which very scantily touches the subject of the nature of morbid muscular contraction, part first might have been omitted without loss to the reader. Such subjects as hare-lip, cleft-palate, writers' cramp, strabismus, synovitis, exfoliation of bone, rickets, malpostures of bones after fractures, etc, can be scarcely more than catalogued in the few pages which contain

them, and, moreover, are out of place in a work treating of what is commonly understood by orthopædism.

In part second the reader will find a fair digest of much that has been written upon spinal curvatures, and talipes and allied deformities. Dr. Prince is evidently a well informed and observing practical surgeon, who believes, with Andry, the godfather of *orthopédie*, that bent spines and limbs should be straightened like the crooked stems of young trees, "by splints of wood and little plates of iron," for the simplification of which, by the way, he has a marvellous gift, that will be duly appreciated by the rural practitioner and patients everywhere whose purses are taxed by the complicated and costly machinery of this branch of specialists. The remedial means for spinal and foot distortions recommended by the author are somewhat too exclusively mechanical to meet entirely our views; nor do we think that he is decided enough in condemning that abomination, tenotomy, which we should be glad to learn had done its worst, and was thoroughly "stamped out."

As a sample of Dr. Prince's therapeutics and style, we give the following extract from his treatment of "Vertical Curvature," "which must," he says, "be like that in the acute stage of other diseases of general low grade. . . . *General heroic treatment cannot be borne, but active purgation once a week*, cleaning out the colon and stimulating the liver and other alimentary glands, creating an appetite and giving a healthier hue to the surface, will constitute an important element in the treatment. Mercury is not an indispensable element in the treatment, but it certainly adds very much to its efficacy. A grain of calomel for a child five or six years old, taken at night and followed in the morning with an efficient senna draught, may be mentioned as an appropriate purge. The mercurial may, *for convenience*, be combined with a sixteenth of a grain of tartar emetic, two grains of lepatandrin, and two grains of sugar, for a patient of this age. Should there be considerable febrile excitement, the force of the circulation may be diminished by *small and frequently repeated doses of tartar emetic*, or, in more active cases, veratrum viride." Dr. Prince remarks that "This element of treatment [which, what ?] may be expected to be of most efficacy while the diagnosis is obscure, the disease being suspected by the gait and posture of the patient before any deformity is manifest." With regard to this treatment of a disease in which there is what Dr. Gross would call "a general dyscrasia of the fluids and of the solids," we should repeat to our younger brethren Hamlet's advice to the players: "Pray you, avoid it." How it can "create an appetite," or "give a healthier

hue to the skin," we are at a loss to understand. The italics are our own.

On the whole, the work will be found a useful compendium of the subject by the general practitioner, and full of practical suggestions. It is nicely printed, and illustrated with ninety-three well done woodcuts.

Infantile Paralysis and its Attendant Deformities. By CHARLES FAYETTE TAYLOR, M.D. Philadelphia: J. B. Lippincott & Co. 1867. 12mo, pp. 119.

In this handsomely executed little volume, Dr. Taylor gives to the profession some of the results of his large experience in the treatment of paralysis in children. While we are not disposed to accept entirely his views of the pathology of this disease, he is entitled to credit for his endeavors to work up the treatment of these cases, and displays a rare ingenuity in the contrivance of mechanical appliances, by the aid of which he is able to exercise special groups of muscles in the paralyzed limbs. His treatment, *motorpathy*, very naturally follows his pathology.

In speaking of the pathology of infantile paralysis, he says, page 18, "The paralysis is nearly, if not wholly, due to the diminished capillary circulation."

If this pathology is correct, we should find this diminished capillary circulation well marked before the access of the paralysis. This he does not attempt to prove, neither has it been observed by others, to our knowledge. That it exists after the parts have been paralyzed for some time time, there is no question. We are inclined to the opinion that it is the result rather than the cause. This opinion is corroborated by the views advanced by Dr. J. P. Batchelder in a paper on paralysis, published in 1858. He says: "The non-communication of the appropriate stimulus to these muscles by the mind constitutes the disease, of which the paralysis is a symptom." His remedy was to direct the mind of the patient to the use or exercise of the paralyzed muscles.

Dr. H. G. Davis, in his recent work upon "Conservative Surgery," article, "Deformities from Paralysis," after pointing out to the surgeon by what processes the patient can be aided in *directing* the *nervous influence* to the paralyzed muscles, says by these "the surgeon can overcome the disease (paralysis) of any muscles where the nervous influence is not interrupted by an organic cause." In the author's chapter upon "Tendency to Recovery," he mentions it as "a curious

circumstance that this spontaneous recovery of a portion of the original paralysis is as much more complete in certain members as it is more imperfect in the remaining ones." His explanation is this: "But nature, immediately after such a shock, is seldom capable of repairing the whole damage which has been inflicted." Again he says: "But why does the reparative process stop half way? Evidently because nature may have exhausted her reserve force." The explanation given by Dr. Davis, in the chapter quoted from above, is in substance this. If the paralysis is not removed in a comparatively short period, the habit, so to speak, not having become firmly established in the child, of using the muscles in a given or natural manner for the accomplishment of a given motion, will effect the object in an irregular or unnatural manner, this result being governed by circumstances or the surroundings of the child. Hence the dissimilarity in the recovery of different individuals.

The efforts of Drs. Batchelder and Davis are solely directed to restoring the connection between the mind or brain and the paralyzed muscles, while Dr. Taylor endeavors to effect it, as we conceive, in an indirect manner.

On Railway and Other Injuries of the Nervous System. By JOHN ERIC ERICHSEN, Fellow of the Royal College of Surgeons, etc. London. 1866. Pp. 144.

This practical and, in other respects, admirable little book consists of a series of six lectures, delivered last spring to the students attending the University College Hospital of London. They relate to the effects of severe blows and twists upon the spine, whereby concussion or shock is caused to this organ. Several very curious and interesting cases are adduced, tending in the main to show the obscurity and lingering character belonging to this class of injuries. Certainly the subjects discussed so clearly by Mr. Erichsen have not heretofore received that attention from physicians and surgeons which he has shown they so well deserve.

In many of the cases of spinal injury not immediately fatal, chronic myelitis, or spinal meningitis, is set up, under which the patient may linger for fifteen or twenty years, though, as Ollivier remarks, they more commonly perish within four years. Mr. Erichsen, whilst thinking Ollivier's view somewhat too gloomy, has not much more consolation to offer.

In those slighter injuries, resulting only in concussion, recovery is possible, and in young and vigorous subjects, and with good treatment,

it is a termination which may confidently be expected. As the author remarks, "the severity of the symptoms gradually subsides, and week by week the patient feels himself stronger and better, until, usually in from three to six months, at the utmost, all traces of the injury have disappeared."

The treatment recommended consists, in the first stage, of rest, dry cupping and occasionally the use of ice-bags to the injured part of the spine. At this period medicine is of little service.

In the second stage, rest and counter-irritation, with the bichloride of mercury, are to be relied upon. Mr. Erichsen justly places a high estimate upon this latter agent in the treatment of the affections under consideration. After all evidences of inflammatory action have disappeared, and paralysis of motion or of sensation remains, strychnine may be administered. Galvanism and salt water douches are also useful at this time.

Mr. Erichsen has done good service by this timely publication, and has opened up a most interesting field for further research.

The Physician's Daily Pocket Record, comprising a Visiting List, Diary, etc. By S. W. Butler, M.D. Philadelphia: Published at the Office of the *Medical and Surgical Reporter.* 1867.

In some respects this pocket companion appears to us to possess decided advantages over any thing that has hitherto been published. It may be used not only as a visiting list, but also as a record of accounts and as a ledger. Not the least of its conveniences arises from the fact that it may be used for a year from any date. There is also given a variety of useful tables, list of new remedies, doses, poisons and antidotes, etc., that, without largely increasing the bulk of the book, add much to its general usefulness.

REPORTS ON THE PROGRESS OF MEDICINE.

THEORY AND PRACTICE OF MEDICINE.

1. *Gastric Ulcer treated by Hypodermic Injections.* (Medical Times and Gazette, July 7, 1866.)

Dr. George Willis narrates an interesting case of this disease, in which the patient being given over to die, hypodermic injection of morphia was resorted to with a view to euthanasia, rather than with any hope of cure; but, behold, when the pain was relieved and some sleep induced, he rallied a little and at the end of a week, being nourished meantime by enemata, was able to retain

small portions of liquid food (at first only milk and lime water) if preceded by the morphia injection, which was of the strength of three *grains of the salt.* This treatment was continued daily for a year, at the end of which time he began the use of beef-tea and mutton-broth, but pain and vomiting invariably returned, if by any chance the injection was delayed. The strength of the injection was then reduced to two grains. This was continued for another year, during which he gradually improved, and then was reduced to one grain, at which strength it was kept for six months, and then discontinued. On a few occasions atropine was substituted for the morphia, but without relief to the pain—a quarter of a grain at one time producing most alarming symptoms. The patient recovered and is now in perfect health, having gained nearly fifty pounds in weight.

2. *Organic Cardiac Murmurs—Disappearance of.* (Medical Press and Circular, August 1, 1866.)

Dr. Lyons, after narrating the history of three cases in point, observes that they, in connection with other instances which have fallen under his observation, tend to establish fairly the following propositions :

1st. That under certain circumstances, endocardial murmurs occurring in the course of rheumatic arthritis, and therefore presumably of organic origin, may disappear in the sequel of the case under treatment.

2d. That by reason of a modified state of system. induced by another disease, as that of typhus fever supervening on rheumatic arthritis, a cardiac murmur of presumably organic nature may finally disappear.

3d. That as it is well established that the intensity of a murmur is no measure of the gravity of the valvular lesion, the persistence of even marked endocardial murmur in the sequel of rheumatic arthritis does not necessarily indicate incurable valvular disease.

4th. That it is highly expedient that all proper measures should be directed to promote the removal by liquefaction or absorption of the bead-like deposit, or incipient warty vegetations upon the valves; and that, so far as is practicable, rest to the heart from all unnecessary exertion and excitement should be enjoined.

3. *Irritable Aorta.* (Medical Press & Circular, July 11, 1866.)

Pulsation of the abdominal aorta, sensible to the patient, often attended with a peculiar uneasiness, and sometimes with positive pain, constitute a group of symptoms which must be familiar to the practical physician as a source of doubt and difficulty in diagnosis, and of much anxiety in regard to prognosis. This condition, Dr. Lyons observes, is common to the male and female, occurs in middle life—30 to 50 years of age—and is liable to be confounded with aneurism.

Dr. Lyons then gives the clinical history of five cases of this nature, and in studying the phenomena presented by them, and considering the light and illustration thrown upon them by what he has observed in similar cases during life, and in the pathological anatomy of the aortic tube in post mortem examinations, he is of opinion that we may conclude that there exists :

1. A state of localized and temporary irritation of the abdominal aorta, attended by a tender and sometimes painful condition of the coats of the

vessel, and marked by an increased calibre of its tube and more forcible pulsation, amounting, in some instances, to violent localized throbbing, and with pain and distress more or less considerable, and conveyed to a greater or less distance along the vessel and the parts contiguous to it, or in connection with it by community of nervous supply.

2. That it is probable this condition is, in the first instance, one of subacute localized aortitis.

3. That this condition is favorable to the ultimate development of atheromatous deposit, consequent injury to the elastic and contractile force of the aorta, and that the upright position favors the distension of the vessel by the pressure of the vertical column of blood.

4. That, consequently, patients laboring under this condition are in the predicament to favor the formation of a condition of true aneurism by permanent dilatation of all the coats of the vessel, if the state of irritation and distension be maintained until, by loss of organic tonicity, or by atheromatous deposit, the walls of the vessel are dilated, and can no longer contract.

5. That, while in this condition, sudden exertion or local injury by blows, crushing weights, etc., or over-distension of the vessel, readily leads to rupture of the internal and middle coats, and so conduces to the occurrence of false aneurism in any of its forms.

6. That absolute rest in the horizontal position, so as to remove the distensile force of the superincumbent column of blood from the weakened and dilated portion of the vessel, is a necessary part of the process of cure.

7. That the diagnosis between this state of partial dilatation and temporary irritation of the aorta and any of the forms of actual aneurism is to be based on the condition of the vessel as determined by most careful digital exploration (after the bowels have been well evacuated); by the absence of bruit except on pressure; by the mobility of the aorta and the very elongated fusiform shape it assumes; by the absence of true diastolic throb; and, lastly, by the effect of horizontal rest in decidedly diminishing, not alone the pain, distress and suffering experienced by the patient, but in sensibly reducing the force and volume of the aortic pulsation.

4. *Chromidrosis, or Colored Perspiration.* By Dr. Germain. (Gazette Hebdomadaire, June 29, 1866.)

Obs. A gentleman, aged 68 years, in vigorous health, presented the following singular phenomena: The morning following a copious pespiration he found upon the back of his left hand spots of dull but deep blue color, with well defined outline, which spots gradually disappeared in a few days. M. Germain had the opportunity of examining these spots on five different occasions, and many of his professional confrères also saw them. The spots left a distinct blue stain upon the wristband, and the skin also presented an equally decided coloration. At one time there was on the back of the left hand a very large spot, tolerably regular in outline, of the dull deep blue color, extending over the superior portion of the first three metacarpal bones, and reaching to the carpus; the veins of the hand were swollen, and of a bluish tint, and from the veins there extended in a radiating manner dotted lines, which were lost in the colored spots. They were about four or five millimetres in length; the skin was not discolored. At another time the spot was situated

on the right radio-carpal articulation. The exuded colored matter was collected upon the linen or by scraping the skin with a scalpel. A chemical examination of the material showed that it was soluble in distilled water, insoluble in ether; the presence in it of iron was proven by the reaction with sulpho-cyanuret of potassium. The discoloration remained at a temperature of 245° Centigrade.

The most of those who have observed cases of colored perspiration have first sought to ascertain if there was not some deception in the case. But here it is to be regretted that a more detailed histological examination was not made, and that the reactions given by sulphuric acid are not noted; but the dull, non-glistening aspect of the spots is an important point. However, we refer those who may be curious enough to study this subject to a memoir by M. Leroy Méricourt (Annales d'Oculistique, 1863), or to a excellent article in the supplement of McKenzie's Traité des Maladies de l'Œil (fourth edition, 1865), where they will find narrated a number of cases of chromidrosis. (*Bulletin de l'Académie Royal de Médecine de Belgique, Année* 1866.)

5. *Case of Intermittent Fever in a Child in Utero.* (Edinburgh Medical Journal, June, 1866.)

At a recent meeting of the Edinburgh Obstetrical Society, Dr. Hubbard related the following case:

In September, 1846, during the universal prevalence of an epidemic form of malarial fever in Illinois, Mrs. C. was delivered of her second child. She had been for many days the subject of intermittent fever of the tertian type, and had noticed that, on the days of the recurrence of the chill, there was an entire cessation of the motions of the child, which, on her "well days" were resumed with their accustomed vigor. The administration of quinine was purposely withheld until after her confinement, on account of its well known effects in causing uterine congestion and inducing premature uterine action.

She was delivered on her "*well day*," and the next day suffered a return of the ague. The child also had a well marked chill, followed by fever. Quinine was administered to the mother, promptly arresting the disease, at the same time apparently arresting it in the child. It has been observed by physicians practicing in malarious districts that, in seasons of unusual prevalence of intermittent fever, in cases where the mother has lost the disease during the whole or greater part of her pregnancy, that it was not very uncommon for children to be born with enlarged spleens, anasarca of extremities, and other appearances which follow protracted ague.

Sir James Y. Simpson stated, in relation to Dr. Hubbard's interesting case of intra-uterine ague, that the disease was alluded to by Dr. Morton and some of the older authors on medicine. Dr. Russell, the author of a celebrated monograph of the Plague at Aleppo, alludes to some instances of children being born with plague-spots upon them, and has given, in a separate paper, the details of a case of ague in the fœtus. In this instance, the mother had attacks of tertian ague every second day in the last weeks of utero-gestation, and the unborn infant had what were reckoned shakings and rigors on the intermediate days. That these shakings were tertian ague also in the fœtus was proved by the fact that the child, after birth, continued to take them every second day till they were arrested by the use of bark.

6. *Treatment of Biliary Calculus.* (British Medical Journal, May 19, 1866.)

Dr. Lutton, in an article in the *Nouveau Dictionnaire de Médecine et de Chirurgie Pratiques*, observes that the radical treatment of biliary calculus should be undertaken only in the intervals between the attacks of hepatic colic, otherwise the symptoms which require special management will only become aggravated. He first describes the treatment of biliary calculi, and then that of the symptoms which they produce.

1. As a remedy for the calculi, solvents have been employed. *a.* Alkaline solvents are much to be preferred to all others; they have produced certain and permanent cures. Sometimes, under their influence, the calculi are broken up or really dissolved, and disappear without leaving any traces; but most usually they are expelled in abundant bilious evacuations. This crisis, preceded often by violent hepatic colic produced by the treatment itself, is not always without danger. The alkaline treatment comprises various medicines, such as the fixed alkalies, salts of soda, carbonate of ammonia, vegetable salts of alkalies, etc.; but the most usual are the waters of Vichy, Vals, Carlsbad, Ems, etc. These waters are used in drinks and as baths; and they must be employed perseveringly, at different periods, during several years in succession. *b.* Durande's remedy consists in the administration of half a drachm to a drachm every day of a mixture containing fifteen *grammes* of sulphuric ether and ten *grammes* of oil of turpentine. Its use has been attended with success; but, far from this success being due to its solvent action, it is found that, where it has succeeded, the calculi have been expelled without being dissolved; so that this remedy appears only to excite evacuation, and belongs rather to the class of expulsives than of solvents. Chloroform has been much vaunted by some; but its efficacy is very doubtful, and it only calms the pain. *c.* As a mechanical expulsive agent, purgatives especially should be ordered; frictions, douches, shampooing and electricity have also been employed to favor the expulsion of calculi. Purgatives are preferable to all these; especially sulphate of soda and castor-oil. In diet, the patient should use fresh and laxative herbs (such as the cichoraceæ and boraginaceæ), grapes, and fruits, and whey. All fat should be excluded from the food; and the diet should be plain and properly proportioned, consisting of roast or boiled meat, vegetables, farina, lemonade, etc. Exercise is salutary; but its object here is less to complete the combustion of fat than to favor the escape of the bile into the intestine and to prevent it from accumulating in the gall-bladder.

2. In the treatment of the symptoms of biliary colic, we should specially seek to assuage the pain. Opium may be given without fear, even in doses of fifteen or twenty *centigrammes* ($2\frac{1}{2}$ or 3 grains); but subcutaneous injection of hydrochlorate of morphia is preferable. Belladonna, praised by Bretonneau and Lalotte, is not so good as opium, and should only be used when this fails. The same remark is applicable to cherry laurel water and to tincture of castoreum. Chloroform administered in inhalation until anæsthesia is produced is a valuable remedy when paroxysms are most violent; it not only calms pain, but may lead to the cessation of the spasmodic contraction of the biliary passages, and thus favor the expulsion of the calculus. (*Gazette Méd. de Paris*, April 14, 1866.)

VARIA.

THE INTERNATIONAL MEDICAL CONGRESS OF 1867.—Continuation of the questions proposed for discussion.

Third Question.—Is it possible to propose to the various governments any efficacious means for restraining the spread of venereal diseases?

The rights of personal liberty impose upon the discussion of this question certain natural limits which cannot be passed. The solution of the problem, therefore, will not be looked for in the shape of a new code of penal statutes that are applicable to the individuals who live under the common civil law. But looking at it from another point of view, the examination of the following topics will in all probability produce some valuable conclusions.

The respective influence of the various sorts of prostitution upon the propagation of venereal diseases is only imperfectly understood. Now, here is a preliminary question, the importance of which should not be underrated. If it could be demonstrated from any positive data, collected from different sources, that there exists in this respect any considerable differences between prostitution that is allowed or regulated, and that which is clandestine, this information alone would be a starting point for new administrative measures, which, being already warranted by scientific observation, would in themselves constitute a real progress.

Whatever may be the results of this inquiry, one thing is already certain, viz., that the surveillance of prostitution is insufficient, when considered in relation to the public health. A more thorough control is necessary, and it is fitting for us to inquire into the best mode of obtaining it.

It will not be out of place also to inquire, if any special measures can be adopted in the case of sailors and soldiers—for in all lands these large masses of men constitute the sources of contagion whose potency has been long understood.

These are the principal topics which raise this important question of the public health. If any exact conclusions can be formularized on the one or the other of these points, the deliberations of the Congress will serve as a basis for some objective propositions to be submitted to the various governments.

Fourth Question.—Of the influence of alimentation employed in different countries on the production of special diseases.

That diet plays an important part in the production of disease is not questioned. But the subject is too broad to be advantageously discussed in its entirety, by reason of the very interest which attaches to it and the numerous questions it gives rise to. The Commission, therefore, have deemed it expedient to confine the questions within very strict limits. Keeping this in view, and also attaching the greatest importance to the least well understood facts, they have decided to strike out of the programme the study of drinks and of insufficient diet, whose morbific action is clearly demonstrated, and to confine the discussion strictly to the consideration of exclusive diets (*i. e.*, animal or vegetable) and noxious diets.

In the first category we shall study the accidental diseases, endemic or epidemic, which may result according as the diet is exclusively vegetable or animal, according to the habitual use and the preponderance of certain articles of food, and we shall endeavor to fix upon the physiological reasons for the morbid phenomena thus determined. To the same class of facts, also, will pertain the accidents which may arise from the different methods of the preparation of food, as, viz., the fattening of animals by close confinement, and the curing by salting or smoking. Corollorary to the first question, facts of this sort should not be overlooked.

Under the principal point—noxious diets—the Commission does not purpose to include those poisonous substances which may be used as food, and they also leave entirely aside the poisonings produced, for instance, by mushrooms, belladonna berries, or certain kinds of fish that are always poisonous. We should limit our investigation to the spontaneous changes in vegetable or animal substances; we should elucidate, if we can, the nature of these changes; should search out the conditions, both of time and place, which favor these changes; and relying entirely upon known facts, should describe the diseases which food thus altered can originate in man. We should endeavor, among other things, to determine the pathogenic action respectively of an exclusive or a noxious diet upon special diseases, as, viz., pellagra, whose etiology is still imperfectly understood.

Thus viewed, the programme embraces the most obscure elements of the question; but although thus limited it is of actual value, both in a theoretical and practical point of view.

Fifth Question.—Of the influence of climates, races and different conditions of life upon menstruation in different countries.

The age at which menstruation commences and the time of the cessation of this function ("change of life") vary with climate, races

and mode of life. The object of the question proposed is especially to determine, by the aid of observations collected under different conditions, but reduced to comparable terms, the share which each of these three sorts of influences possesses.

The data which are already known in science are not perhaps sufficiently numerous or varied to enable us, at present, to solve this complicated question, but its solution can be very nearly reached in the memoirs presented to the Congress by the physicians of different countries.[1] Without pretending, in any respect, to limit the scope of their researches, the Commission deem it proper to point out to them the principal elements of the question.

To appreciate the influence of the mode of life, it is necessary to draw comparisons between the many classes of women belonging to the same race and living in the same country, but under different conditions. These classes can easily be reduced to three: women in easy circumstances, working women and the poor in cities, and peasant women. The facts already known tend to show that the average age of the first menstruation differs very materially in these three classes (which can, if necessary, be increased).

The opportunity of making a comparison, in all its required exactness, among women of the same race, is rarely presented in the countries inhabited by European races. For the most of these European peoples, both of the Old and the New World, are the offspring of a mixture of races more or less closely allied—a mixture which shows itself in the variations of certain external characteristics, such as the color of the eyes and the hair. It would be very interesting to make note of these anthropological characteristics, in order to establish in

[1] The following tabular form is suggested (to be added to the memoirs), for the purpose of securing uniformity in the reports:

Cases observed.	Age.	Social condition and profession.	Age at first Menstruation.	Menstruation Regular or Irregular.	Interval between Menstruation.	Duration of period.	Married or single.	Number of Children and Miscarriages.	Age at cessation of Catamenia.

Add remarks on stature, color of eyes and hair, constitution, etc. The table should be accompanied, also, by notes on the place of observations, longitude, latitude, altitude, temperature, etc.

each group secondary groups, presenting elements as nearly comparable as possible.

The influence of climates upon the phenomena of menstruation will bring us to the study of women of the same race, living in different climates, but under social conditions closely allied.

Finally, observers stationed in the countries inhabited by races that are positively distinct, will be able, in fixing the groups, at the same time, upon the conditions previously pointed out, and also upon the anthropological conditions, and without neglecting the important study of women of mixed races, to solve the problem of the influence of race upon menstruation.

It is understood that the study of the anomalies of menstruation, considered in their relations to the influences above mentioned, enters directly into the subject proposed.

Sixth Question—Of the acclimation of European races in hot countries.

The question proposed has no reference to the acclimation of individuals. Europeans cannot locate in hot countries without exposing themselves to certain diseases which, to a greater or lesser extent, increase their chances of death; still, a certain number of individuals will escape, partly by the aid of a peculiar constitutional insusceptibility to disease, and partly by the aid of a mode of life which can neutralize the disastrous effect of the climate.

We should not confound these individual facts with those which relate to the acclimation of a race. Any given number, even if large, of individuals acclimated, is not sufficient to prove the acclimation of the race to which these individuals belong, for it may be that their descendants will not, like them, escape the influence of the climate, and in the course of several generations they may become extinct, of which there are too many examples.

A race is acclimated in a country only when it can indefinitely maintain itself *by itself*—*i. e*, without either crossing with the natives or receiving accessions from the parent country more or less frequently. The attempt to prove the acclimation of a race by taking as a groundwork of calculation only the numerical increase of the population, is therefore radically faulty. The arrival of new immigrants may so fully counteract the deadly effects of the climate as to give in this or that colony a numerical increase; and yet, left to themselves, they would be threatened with speedy extinction. The comparison of births with deaths, which is, nevertheless, the only true method of procedure, has not been entirely free from this same source of error, for the reason

that the majority of immigrants, having already passed beyond the age of infancy, which is the most dangerous period of life, are not, as a rule, included in the estimates of the population until after they have arrived at the state in which they are capable of producing offspring. Hence the necessity for separating the group of immigrants from the colonists born in the country.

For a race to be thoroughly acclimated, it is not alone sufficient for it to maintain its own proper line of descent. It must also be able to subsist by its own labors in cultivating the soil, and not by causing people of another race to cultivate it for them. That acclimation which is dependent upon the reducing to subjection of an indigenous or foreign race and maintaining them either as domestics or slaves, can only be temporary, according to the surrounding political conditions.

The principal object of the question presented is to obtain documents relating to the complete acclimation of Europeans in hot countries. Yet it will not be without interest to study the conditions by the aid of which these races, though not fully acclimated, can at least maintain their existence by the labor of others in hot countries, where they could not devote themselves to the cultivation of the soil without becoming extinct.

Without undervaluing such labors, which could be adduced to the Congress, the Commission still believe that they ought particularly to call for exact papers on the acclimation of one or other European peoples in any hot countries. They suggest the wish that each one of these memoirs should be accompanied by the most complete information that is possible concerning the medical geography, meteorology and climatology of these countries.

Seventh Question.—Of the entozoa and entophytes which can be developed in man.

The Commission, in proposing as a subject for study the production of parasitic animals or vegetables, has been guided in its choice by the importance of the researches which have been undertaken in our time.

The works relating to parasites are so numerous, and cover so wide a field in scientific research, that the first business of the Commission is to put some limit to the programme for discussion. It has seemed to them necessary to exclude the ideas that are already definitely accepted and sanctioned by long experience, and thus to give greater scope to those problems still undecided, and which alone can be of value in the discussion. It is in conformity with this view that they have devoted themselves to placing limits to the discussion.

Those species of parasites known as epiphytes or epizoa, which have their exclusive habitat in the skin or mucous membranes bordering on

the skin, have been the objects of repeated investigations; their history is already so well-nigh complete as to call only for the briefest descriptions.

The animal parasites which are developed in the course of certain diseases, and thus become, more or less, complications of that disease, and which recognize as a necessary antecedent the previous existence of some general or local lesion, do not appear to be any more worthy of figuring in the programme for discussion.

Again, in limiting ourselves to the study of those species which, being taken into the human subject, become the cause of disease, and give rise to particular morbid changes, or produce special symptoms, it is important to first pay attention to their natural history. The pathology of the disease occupies provisionally a place of secondary importance, for the reason that it can be scientifically established only after we shall have obtained positive ideas of the origin, anatomy and physiology of the parasites themselves.

Considerations of measures relating to public hygiene and medical police are, for the same reason, excluded.

The species of animal parasites on which, it seems to us, we ought especially to fix our attention are those which, subject to well marked transformations, have exterior forms, habitats and modes of existence that vary with the period of their evolution; particularly those which undergo such metamorphoses that a long period is required to trace the identity of the individual through all its diverse aspects. It is this order of ideas that has accomplished the most meritorious discoveries of our day.

If, instead of stopping with the parasitic diseases, we take, as our point of departure, the parasite itself, it is evident that we should hardly confine ourselves to human pathology. In the course of their migrations, according to their mode of existence, the human parasites dwell or can dwell in various species of animals, and announce their presence there by symptoms which correspond to each stage in their evolution. To confine ourselves to the history of the parasites in men would not only break the series, but deprive us of the means of investigation which are furnished by animals. The question of parasitism can only be solved by experimental researches, undertaken under conditions not found in human medicine.

The Commission expressly insists upon the necessity of strengthening, by positive experiences, the opinions that may be put forth. This would imply the bringing forward only of facts of which the observers have themselves been witnesses, and which, for the most part, have

been incorporated in the numerous monographs published on this subject. It is important to place before the Congress preparations, photographs and living specimens, and to repeat, as far as may be possible, the experiments, in such a way as to furnish, at the time, proof of the laws governing the development of the parasite. In order that the sessions of the Congress may not be burdened with double work in listening to dogmatic treatises, the only requisite is to place before the eyes of all facts and means for proof.

The same principles apply to the history of vegetable parasites or to the entophytes, but here the data are more complex. The most of the vegetable species, after eliminating those which fix themselves upon the skin, are only secondary productions developed in tissues already changed in character. They do not explain the origin or progress of the morbid phenomena, and cannot, therefore, be considered as characteristic of the disease. The pathological significance of the entophytes is entirely beneath that of the entozoa. Nevertheless, as all these species are far from being accurately described, it is desirable to insist upon their classification—in aiding the description by means of specimens and microscopical preparations. An exhibition of types of these parasites will do more towards popularizing knowledge that is now not widely known than the most elaborate description.

New York Academy of Medicine.—At the meeting holden Jan. 10th, the following officers were elected: President, Dr. A. C. Post; Vice-President, Dr. I. E. Taylor; Trustee, Dr. W. B. Bibbins; Committee on Medical Education, Dr. F. H. Hamilton (long term), Dr. E. R. Peaslee (short term); Committee on Admissions, Dr. G. M. Smith (long term), Dr. Ellsworth Eliot (short term); Committee on Ethics, Dr. G. Buck. The following named gentlemen have also recently been chosen Resident Fellows: Drs. E. B. Dalton, James H. Anderson, Everett Herrick, J. L. Brown, Leonard Weber, J. W. McDonnell, S. W. Dana and J. W. Pooley. Prof. Brown-[illegible]d was elected Corresponding Fellow.

We devote a large space in the present number to Dr. Lidell's paper on osteo-myelitis, to the exclusion of other valuable matter that we had in preparation; but we are sure our readers will agree with us that the space could not be more advantageously used, for the paper in question is one of the most valuable memoirs on this su[illegible] that has ever appeared, and we desired to present it in a complete form to the profession.